THE FOUNDRY

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WESTERN FOUNDRYMANS ASSOCIATION.

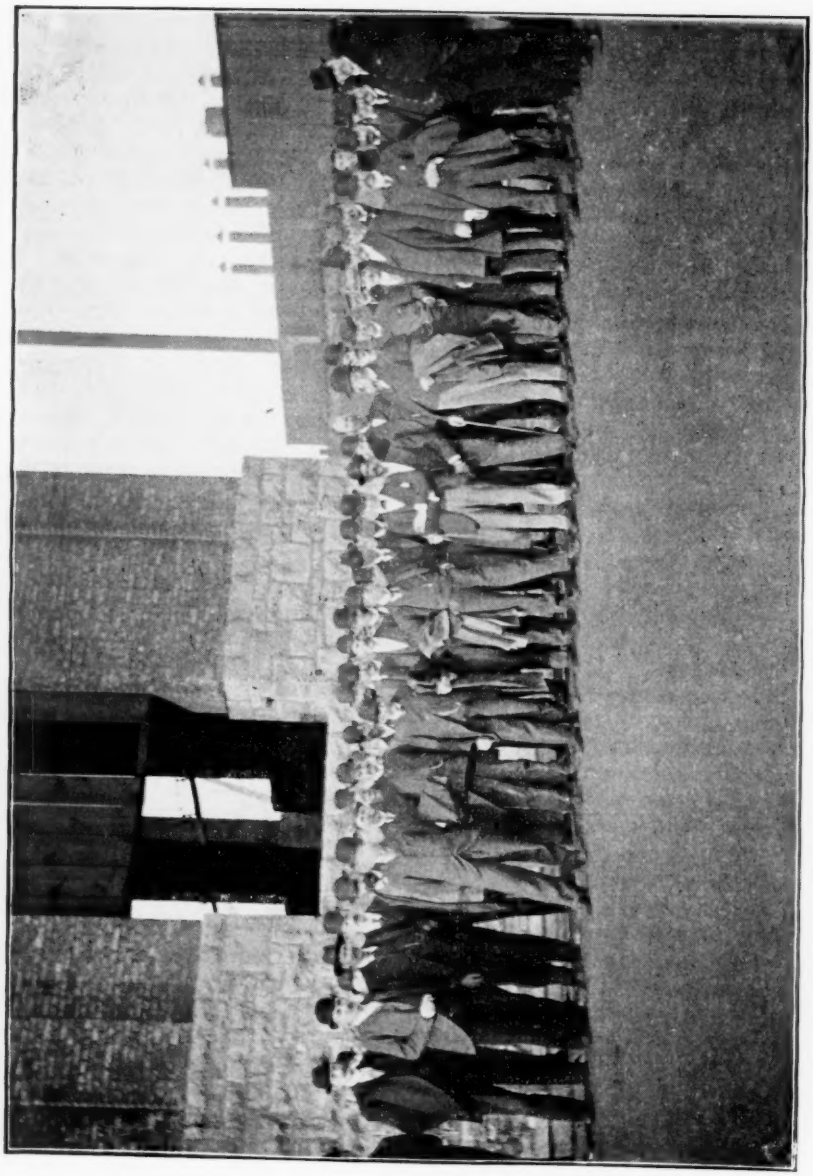
They Visit the Illinois Steel Co's. Works—Banquet in the Evening.

Wednesday, September 26th, will always be a red letter day in the history of the Western Foundrymen's Association, and those who were so fortunate as to be able to take part in the trip given under its auspices to the Illinois Steel Works in South Chicago, and who were present at the banquet at the Palmer House in the evening will always entertain the most pleasant recollection of both events.

To begin with, it was an ideal fall day, the sun was shining brightly and a delightfully fresh breeze was blowing gently off of Chicago's great lake (Michigan). The party numbered over 80 including the members and invited guests. They nearly filled two of the comfortable cars on the Illinois Central Railroad provided for their transportation through the courtesy of Pickands, Brown & Company, who are the selling agents of the pig iron products of the Illinois Steel Company's furnaces at South Chicago and Milwaukee.

Among those present were the following: Jahn M. Sweeny; Geo. M. Sargent, W. D. Sargent, G. H. Sargent, the Sargent Co.; E. G. Elcock, Peter Maischall, Hansell, Elcock & Co.; S. T. Johnston, Whiting Foundry Equipment Co.; Maj. Malcolm McDowell, McDowell Steel Co.; C. S. Reed, Chicago Retort & Fire Brick Co.; W. M. Wilson, S. Obermayer Co.; R. W. Hunt, R. W. Hunt & Co.; F. B. Whitcomb, S. Dauchy, Dauchy Iron Works; E. C. Potter; E. J. Welch, Robert Craig, Weir & Craig Mfg. Co.; John H. Blood; W. W. Backman; Wm. Francis, King & Andrews Co.; H. S. Vrooman, N. C. Fisher, Garden City Sand Co.; Jas. Frake; H. A. Keith, East Chicago Foundry Co.; W. C. Waterbury, C. E. Lewis, Foster, Hawes & Co.; John J. Meehan, J. Henry Debus, Lake Shore Foundry Co.; C. H. Vannier, G. W. Henderson, Griffin Wheel Co.; C. I. Bewley, McCormick Harvesting Machine Co.; L. Wolff, Jr., C. J. Wolff, L. Wolff Mfg. Co.; M. D. Bastues, Reedy Elevator Co.; D. L. Cobb, Sloss Iron & Steel Co.; G. D. Turner, Turner, Dickinson & Co.; H. S. Pickands, Pickands, Brown & Co.; W. Nygren, King & Andrews Co.; W. E. Wakefield, John Featherstone's Sons; A. Sorge, Jr., Fraser & Chalmers; W. S. Cummings, Board & Cummings; F. H. Taylor, Union Foundry & Pullman Car Wheel Works; S. C. Hibben; C. H. Besley, C. H. Besley & Co.; T. A. Hagerty; E. C. Greenlee, Greenlee Bros. & Co.; J. F. Laubender; A. M. Thompson, Link-Belt Machine Co.; E. W. Yoemans, E. W. Yoemans & Co., J. R. Graves, Chicago Stove Works; A. C. Ely, James Ely, C. P. Wheeler, Pickands, Brown & Co.; Geo. W. Cope, J. K. Hanes, *Iron Age:* J. B. Mansfiele, *Industrial World;* F. H. Clarke, *Railroad Gazette:* B. M. Gardner, *Iron Trade Review*, Chicago; A. W. McArthur, Rockford Foundry Co., Rockford, Ill.; C. A. Sercomb, Schwab & Sercomb, Milwaukee, Wis.; C. C. Heald, Union Malleable Iron Works Co., Moline, Ill.; W. D. Turner, H. N. Wade, United States Wind Engine & Pump Co., Batavia, Ill.; Thos. Snow, Challenge Wind Mill and Feed Mill Co., Batavia, Ill.; C. W. Woodruff, J. C. Daniels, C. H. Woodruff Co., Elgin, Ill.; E. A. Wheeler, Wheeler Furnace Co., Sharon, Pa.; Alfred D. Edwards, Illinois Iron & Bolt Co., Carpentersville, Ill.; M. N. McLaren, Edward P. Allis Co., Milwaukee, Wis.; L. A. Baker, L. A. Baker & Co., Elgin, Ill.; Lewis J. Cox, Terre Haute Car and Mfg. Co., Terre Haute, Ind.; H. M. Lane, Lane & Bodley Co., Cincinnati, O.; A. L. Hott, A. L. Hott & Co., Harvey, Ill.; F. B. Bain, Morris Foundry Co., Morris, Ill.; John A. Penton, THE FOUNDRY, Detroit, Mich.; L. E. Ellsworth, Racine Hardware Co., Racine, Wis.; C. F. Austin, F. F. Collins, Mfg. Co., San Antonio, Tex.; W. N. Moore, Lewis Moore Joliet Stove, Works, Joliet, Ill.

On arriving at the works the party was taken in charge by several of the company's officers and shown through the entire plant.



GROUP IN REAR OF CASTING HOUSE.

Some parts of it, especially the converter plant, are said to be among the most modern and perfect in existence. Several hours were very pleasantly spent in watching the manufacture of steel rails, upon which the mills were running and the whole operation from the unloading of the pig iron from one of the company's boats to the inspection of the finished and perfect rail elicited many favorable comments.

The almost human manner in which some of the very largest and apparently most cumbrous combination of gears, rolls, etc., did their work excited unbounedd admiration, and the skill with which the largest hydraulic cranes were handled when heavily loaded created much surprise. After spending nearly three hours witnessing operations that were as instructive as they were fascinating, the party returned to the city, where the party separated to meet again in the evening.

The Banquet.

At seven o'clock in the evening the members of the Association and their friends began to gather in the parlors of the Palmer House, and judging from the countenances of those present, the recollections of the afternoon's pleasure and anticipations of that to come seemed to put everyone in the best of humor. The banquet itself seemed to have the usual effect and was certainly fully up to the standard among the events of a most enjoyable day. After it had received the undivided attention of all present the President of the Association, Mr. George M. Sargent, of the Sargent Company, rapped for order and made a very pleasant speech of welcome, in which the Association, its objects and prosperity were reviewed.

Mr. Sercomb then offered the following resolution, which was unanimously adopted:

Resolved, That the Association and gentlemen present extend Messrs. Pickands, Brown & Company their most sincere thanks for the delightful and instructive trip enjoyed to-day through their generosity, and also the Illinois Steel Company for showing us through their works at South Chicago.

Mr. Sargent introduced Mr. E. C. Potter, who, he said, had very kindly prepared a paper to be read at this meeting.

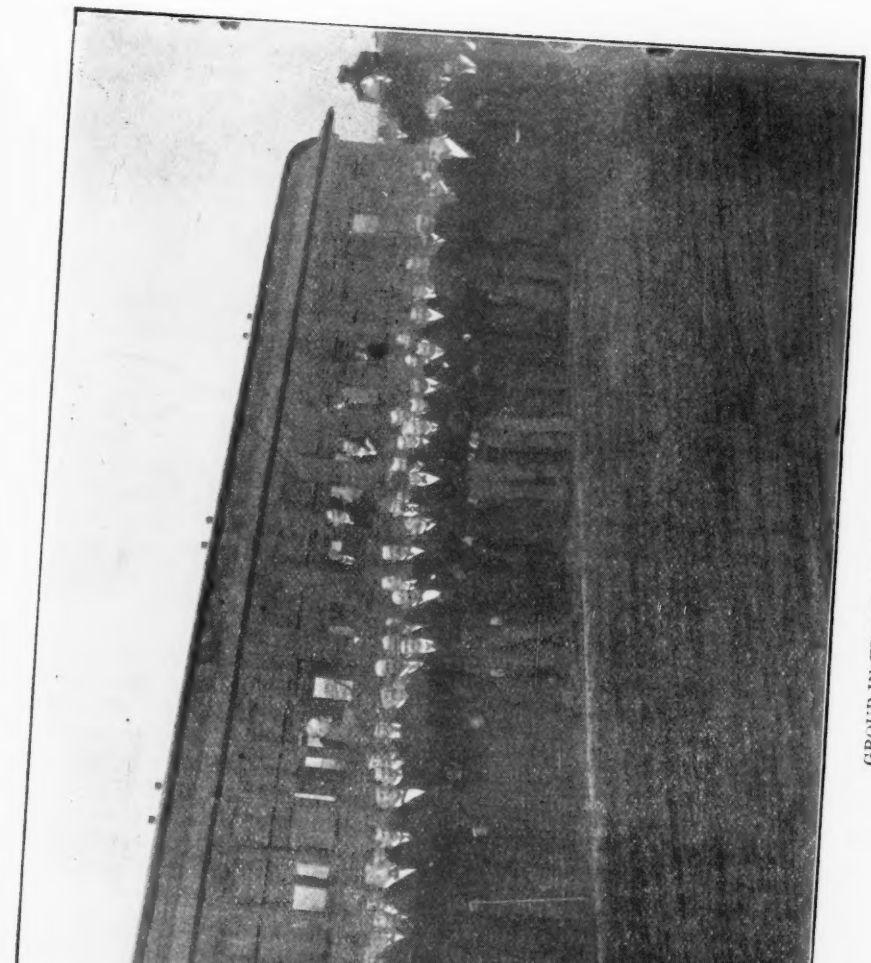
Mr. Potter said he felt highly flattered to read a paper at the initial dinner. At the request of the secretary he had prepared a paper on "The Blast Furnace," as a subject which would be of great interest to foundrymen. In the paper he had endeavored to put the subject in the simplest manner and to avoid anything like technicality. If he had omitted any details he would be glad to have his attention drawn to them and would gladly reply to all questions.

The Blast Furnace.

Raw iron, or "pig iron" as it is commonly called, is produced by deriving from iron ores (oxides of iron) the metallic iron they contain in their composition. Stated briefly. this is accomplished by exposing the ores to the chemical action of carbonic oxide, formed by the combustion of coal or coke, which, by taking up the oxygen of the oxides of iron leaves the metallic iron free. In addition to this the earthy impurities of the ores have to be dealt with in a manner to be explained later.

The apparatus in which this process is carried on is known as a blast furnace, so called because the ordinary combustion of the fuel is augmented and accelerated by forcing into the furnace by mechanical means large volumes of air. This air, delivered into the furnace under high pressure, is known as "the blast." As indicated above, the materials to be dealt with in the operation are, first, the ore; second, the fuel by whose combustion we obtain the active element in the reduction of the ore, carbonic oxide; (this fuel is a more or less pure carbon in the shape of charcoal, coke or anthracite coal); third, a material technically called a "flux" is required whose office is to remove the earthy impurities of the ores. For this purpose limestone is usually employed. The way in which this is accomplished is rather an intricate chemical reaction, but stated as simply as possible the reaction is as follows: The principal earth associated with the ore of common clay, or silicate of aluminum, as it is chemically called. This material, as every one knows, is quite infusible and hence impossible to remove by the mere application of heat. It is a chemical fact, however, that by the addition of lime to the silicate of aluminum, forming the double silicate of lime and aluminum, this double silicate being quite fusible and being lighter than the metallic iron, floats upon its surface, and is thence drawn off in a manner to be indicated later.

This is, briefly, the office of the flux. These three materials, together with the air blown



GROUP IN FRONT OF CAR

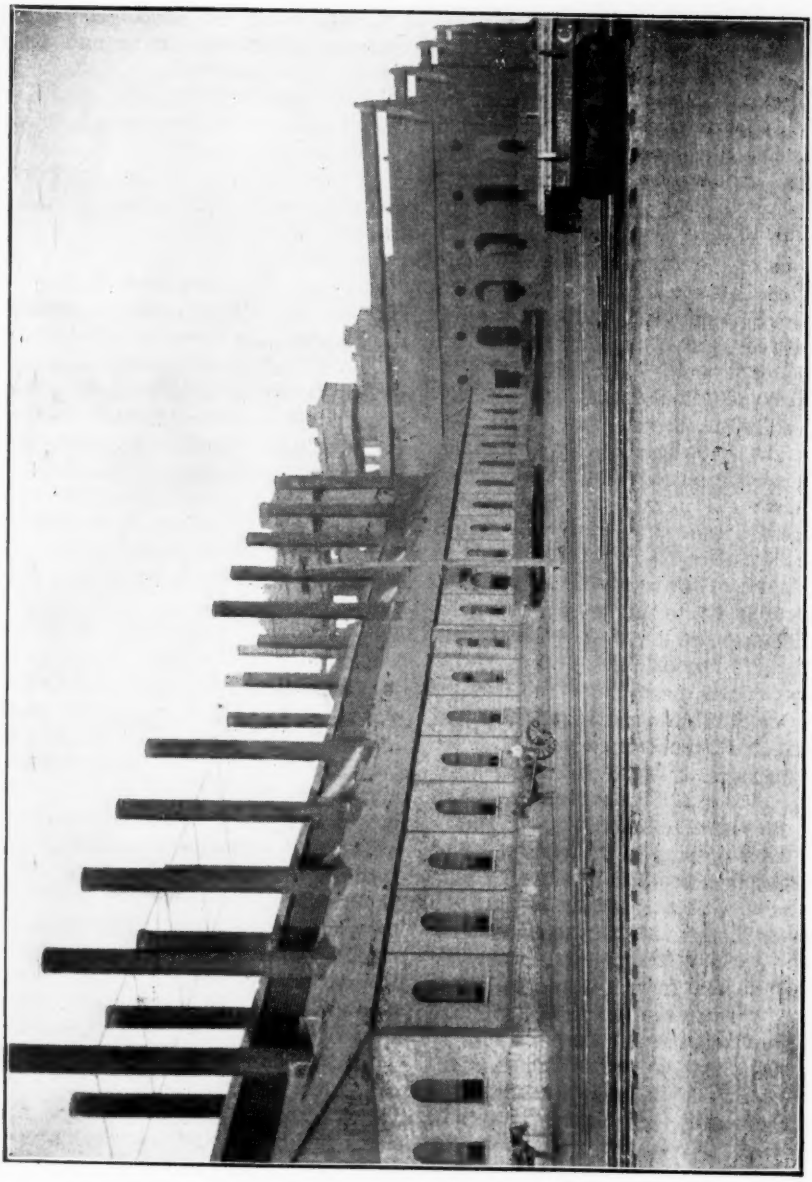
into the furnace, are all that are required to carry on the operation of smelting pig iron. I mention the air, as that is not by any means as insignificant a feature as would be at first imagined; for the actual *weight* of air blown per ton of iron produced is six or seven times the weight of the solid materials charged.

The blast furnace itself is a very large structure, circular in section, of a height varying from 60 to 90 feet and a largest diameter of about one-fourth the height. The contour of the interior is not that of a perfect cylinder, but from the point of largest diameter (technically called the "bosh" diameter) the walls are drawn in both upward and downward, so that at the bottom of the furnace the diameter is only about one-half the bosh diameter and at the top about 30 per cent. smaller than the bosh. The lowest part of the furnace is called the "hearth" or "crucible," for it is here that the molten iron collects before being drawn off. The walls of the crucible are from five to six feet in height and usually perpendicular. From the top of the crucible walls the furnace slopes outward and upward till the bosh is reached. This whole section of the furnace is also known as the "boshes," and it is here that the actual fusion of the materials takes place.

From the bosh up to the top the the walls slope in again.

The materials, viz. ore, fuel and flux—are charged into the furnace from the top by means of a mechanism known as a "bell and hopper," which at the same time closes the top of the furnace. A heavy cast iron hopper is fitted over the top of the furnace, leaving an opening in its center of about half the bosh diameter. This opening is closed by a heavy iron bell, lifted into position from the interior of the furnace so that the lower edge of the hopper on its under side for three or four inches. Thus when the bell is drawn up tightly against the hopper the furnace is tightly closed even to the escape of gas. The materials are then dumped into the hopper until it is full, when the bell is then lowered by means of a mechanically actuated and balanced lever arm so that a space of 15 to 20 inches is opened between the contact edge of the bell and hopper, and through this space the materials slide over the sloping sides of the bell into the interior of the furnace. This bell shape is used for the purpose of obtaining an equal and uniform distribution of the materials over the area of the furnace, which would not be possible were the materials dumped into an ordinary opening. This uniform distribution in charging is very important to the uniform working of the furnace; for if the materials were all dumped into the center or to one side, the ascending carbonic oxide gas, seeking the easiest way out, would but imperfectly act upon the great mass accumulated in one locality and the furnace would work one-sided. The great height of the furnace is required in order to expose the ore for a sufficiently long time to the action of the carbonic oxide. The descent of the ore from the top to the bottom of the furnace occupies from 18 to 24 hours. On a level with the floor of the crucible, on the front side of the furnace, is situated the "tapping hole." This hole pierces the wall of the furnace to its interior and through it the molten iron is drawn out. The tapping hole leads directly into a trough which communicates with the casting beds. This hole is stopped up with clay during the time the iron is collecting in the crucible. Tapping takes place usually every six hours. About three feet above the tapping hole and sometimes directly over it, sometimes to one side, is the slag tap or "cinder notch" as it is technically called. The slag formed by the flux, floating upon the surface of the iron is here drawn off from time to time as it rises to this height. It is usually run directly into buggies or cars constructed for the purpose and hauled off to the cinder dump.

The blast is introduced into the furnace at the top of the crucible, about five or six feet above the floor. At six or eight equidistant points in the circumference of the furnace wall, openings are made into the interior of the furnace. Into these openings water-cooled "holders" of bronze or iron are fitted. Into these holders are accurately fitted the blast nozzles or "tuyeres," also water-cooled. The water-cooling is accomplished by casting a coil of pipe in the iron holder or tuyere through which water is continually forced, or in the case of the bronze tuyere and holder, the walls are made double with a space between in which water is kept circulating. At a sufficient height above the tuyeres a main blast pipe encircles the furnace from which branches are led down to each tuyere. The tuyere nozzles are inserted from six to ten inches beyond the inner wall into the furnace. The water-cooling of the tuyeres and holders, while designed primarily for their maintenance, aid much in preserving the brick work adjacent



BOILER AND CASTING HOUSES, BLAST FURNACES (South Side).

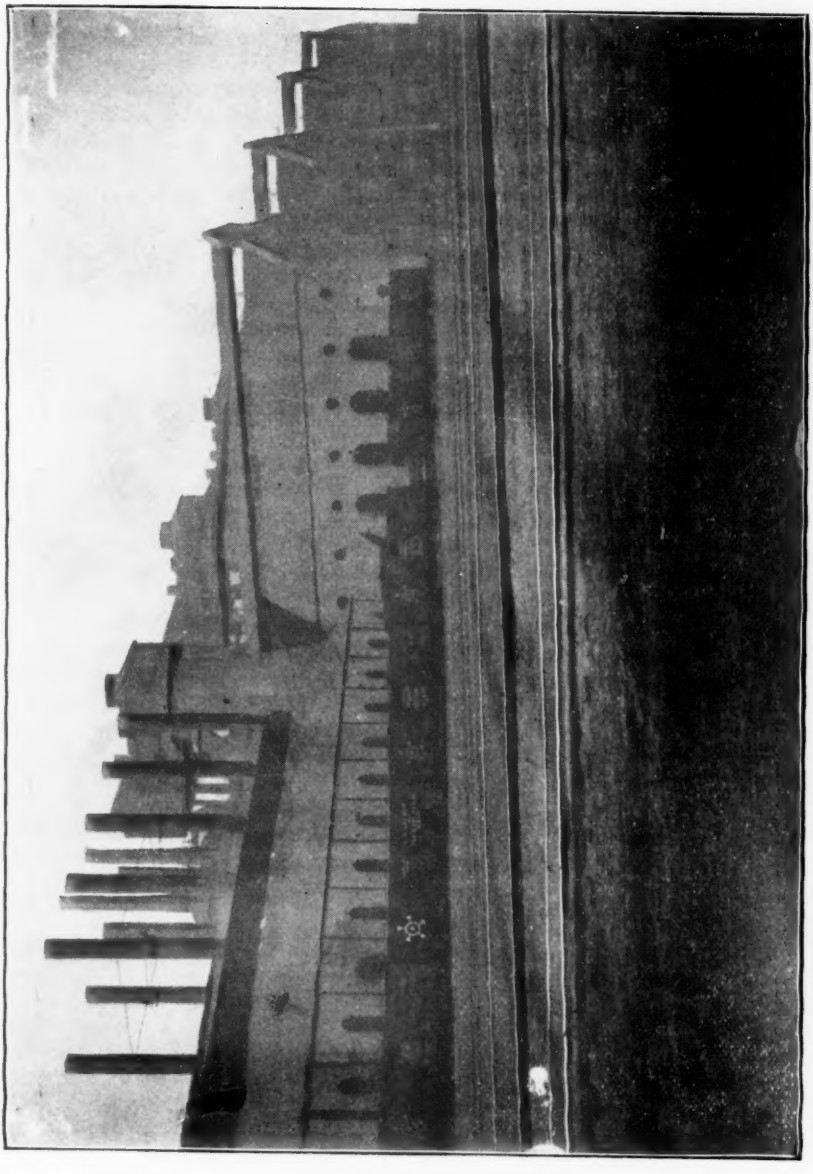
to them. Following up this hint, the bosh walls of the furnace are now greatly prolonged in life by inserting rows of water cooled plates completely encircling the furnace at distances of about 30 inches between the rows. These are built in the brick work and are invisible except the outside edge of the plate and the water connections. These plates are removable in case of leak, which is rare.

The accessories to the blast furnace proper are the boilers, blowing engines, hot blast stoves, hoists and water supply. The boilers and stoves are heated by waste gases from the furnace, so that the furnace is practically self-supporting in the matter of power, the only fuel necessary being that put into the furnace for the purpose of smelting. The furnace gases rise to the top of the furnace and are thence conducted away by a large pipe called "the down-take," which carries the gases down to the main flue which lies underground. This flue conducts the gases to the boilers and stoves. The lower end of the down-take is enlarged just before it enters the flue into a chamber of considerable size known as the "dust-catcher," which name sufficiently describes its function. The gases carry away with them considerable quantities of dust which accumulate in the flues, stoves and boilers, seriously imparing their efficiency by choking them. This the dust-catcher is designed to obviate. The boilers and blowing engines need little description, as they speak for themselves. The use and operation of the hot-blast stove is a subject of much interest, and to the furnaceman it is a very considerable factor in the furnace economy.

It is apparent that if air at the temperature of the surrounding atmosphere be blown into the furnace it will require a certain amount of fuel to bring is up to the temperature of the fusing mass. If this air could be heated, and that, too, without further expenditure of fuel, before it is delivered into the furnace, it is evident a considerable economy of smelting fuel must result. This is what is accomplished by the hot blast stove. The waste gases of the furnace, which formerly were permitted to escape into the air, are by this apparatus utilized for the heating of the blast. Stoves as constructed now-a-days consist of a large shell of tank plate enclosing a mass of fire-brick so disposed as to form a large number of small flues or checkerwork. Each stove measures from 15 to 20 feet in diameter and 60 to 70 feet in height, being nearly as large as the blast furnace itself. A total cross-section area of, say, 300 square feet is subdivided by the brickwork into a large number of small flues of, say, 40 square inches, thus muliplying the heating surface enormously. These flues are constructed perpendicularly. The gas is admitted at the bottom of one side into a chamber where it is mixed with the proper proportion of air to produce combustion; thus ignited it rises to the top of the stove where it is deflected down again through a series of small flues. On reaching the bottom it is deflected up again and then down, having traversed the height of the stove four times before it passes off by the chimney. The gas having been passed through the stove a sufficiently long time to bring the whole mass of brickwork to a bright red heat, it is then shut off and the blast from the blowing engines is then admitted on the *opposite* side of the stove from the gas, and is made to travel over the same path through the stove in the *reverse* direction. During its passage it absorbs the heat from the brickwork, raising its own temperature to from 1,200-1,500 deg. F. From the stove the air is then carried by the blast main directly to the tuyeres. There is usually three and sometimes four stoves attached to each furnace. Each stove is kept on gas for two hours and on air for one hour; three stoves therefore permit of two stoves being kept continually on gas and one on air, a stove being changed every hour. Of course before the blast is shut off of one stove it is admitted through a fresh one, as the blast must be kept continuously on the furnace.

Another valuable feature of the hot blast stove is the fact that it places within the control of the furnace manager an amount of caloric or heat energy entirely subject to his manipulation; thus, if the furnace is disposed to work cold an increase of temperature of the blast will usually act as a corrective, and vice versa. In the uniform production of a desired grade of iron this is of the highest value. In this connection a very brief consideration of the chemistry of pig iron may not be out of place.

In recovering from the ore the iron it contains we do not obtain that iron chemically pure, nor is it desirable that we should do so. We have seen how the earthy impurities were to a considerable extent removed, viz: the silicates of alumina, lime and whatever of magnesia there may be in the ore. But certain other elements, notably phosphorus and man-



BOILER HOUSE AND CASTING HOUSES (North Side.)

ganese, are not thus removed; nor are they ever completely removed, the second only partially, the first not at all. In addition to the impurities of the ores we are adding with the fuel, especially where coke is used, another lot of impurities, notably silica and sulphur. Silica, or silicic acid, as it is chemically called, being a compound of silicon and oxygen, is not capable of being decomposed into its constituent elements, silicon and oxygen, except at the very highest heat. Therefore, out of the very large amount of silica in the form of silicates that is charged into the furnace, we find only a comparatively small proportion appearing in the pig iron as silicon, which has doubtless been decomposed in some areas of very high temperatures before the tuyeres. A portion of the sulphur is carried off in the slag, but enough remains to make a deal of trouble to the pig iron consumer. In the resulting iron, then, we find in addition to the metallic iron such impurities as silicon, sulphur, phosphorus, manganese and carbon. The carbon in pig iron exists in two states, free carbon in the form of crystals or flakes and combined or dissolved carbon which has been taken up by the iron before the tuyeres. The proportions in which these two conditions of carbon exist in the pig iron depend upon the temperature of the furnace; if the furnace is hot, the carbon exists in very large percentage as free carbon or graphite; if the furnace is working cold, the carbon in the iron will be found largely as combined carbon with little graphite. So, too, as might be inferred from what was said before, a cold iron will contain little silicon, as the temperature before the tuyeres has not been sufficient to decompose the silicic acid. The temperature also has a marked influence on the behavior of the sulphur. With the furnace working hot, it is nearly all carried off in the slag, but at lower temperatures its greater affinity for the iron asserts itself and a cold iron is found to contain an objectionable amount of sulphur. Cold iron, therefore, will be low in silicon, low in graphitic carbon and high in sulphur; for most purposes an undesirable combination. The value of the hot blast stoves in enabling the furnace manager to correct the temperatures of his furnace is thus made plain.

The operations of the blast furnace are continuous until the fire-brick lining wears out. This occurs in from two or three years under ordinary circumstances; or, a better way of stating the life of the lining is that it will generally yield 125,000 to 150,000 tons of iron, though one or two of America's famous furnaces have turned out 300,000 and even 400,000 tons on a single lining. The management of a blast furnace, the proper mixing of the materials, the regulation of the working of the furnace itself for the production of a large, uniform and economical output calls for the highest skill, watchfulness, patience and often courage. An accident to the furnace is almost always expensive and often dangerous; the apparatus is always operated under high pressure and the highest heats known to science. Altogether the management of a blast furnace presents a most intricate problem in economical metallurgy.

The President then called upon Mr. Wheeler, who apparently regretted it, as he said he was not a public speaker. He had been engaged in the iron business all his life and wished to thank the Association for the pleasant afternoon he had an opportunity of spending with them, and thought they were all better for what they had seen and the experiences they had enjoyed. In his opinion the spectacle of an engineer stepping into his locomotive, pulling the throttle and the locomotive starting and being followed by a long train of cars was one of the finest sights, showing what brains would do when rightly directed. One man's brains moved the whole train. It was so at the Steel Works; they saw the ore lifted with a steam shovel, no hand being touched to it, hauled up by a locomotive, raised on a hoist by steam power, put into a furnace, run into pigs, carried down by steam engine and blown and converted into ingots without anyone touching it. The ingots were put into a soaking pit to take from them the lateral heat, taken out and run into a ribbon 90 feet long and then sawed into steel rails. The only time he saw them handling it was at the finish when a man with a file smoothed off the ends. The rest was the work of brains. The proverb that "there is nothing new under the sun" was incorrect; the Bessemer process was a new one—it was one of the grandest discoveries made in connection with the iron business. The Bessemer process was invented by Sir Henry Bessemer, an Englishman, and while he received much credit for it and brought it to the front, its discovery was a mere accident. Mr. Bessemer thought he had his process perfected and gave out licenses to

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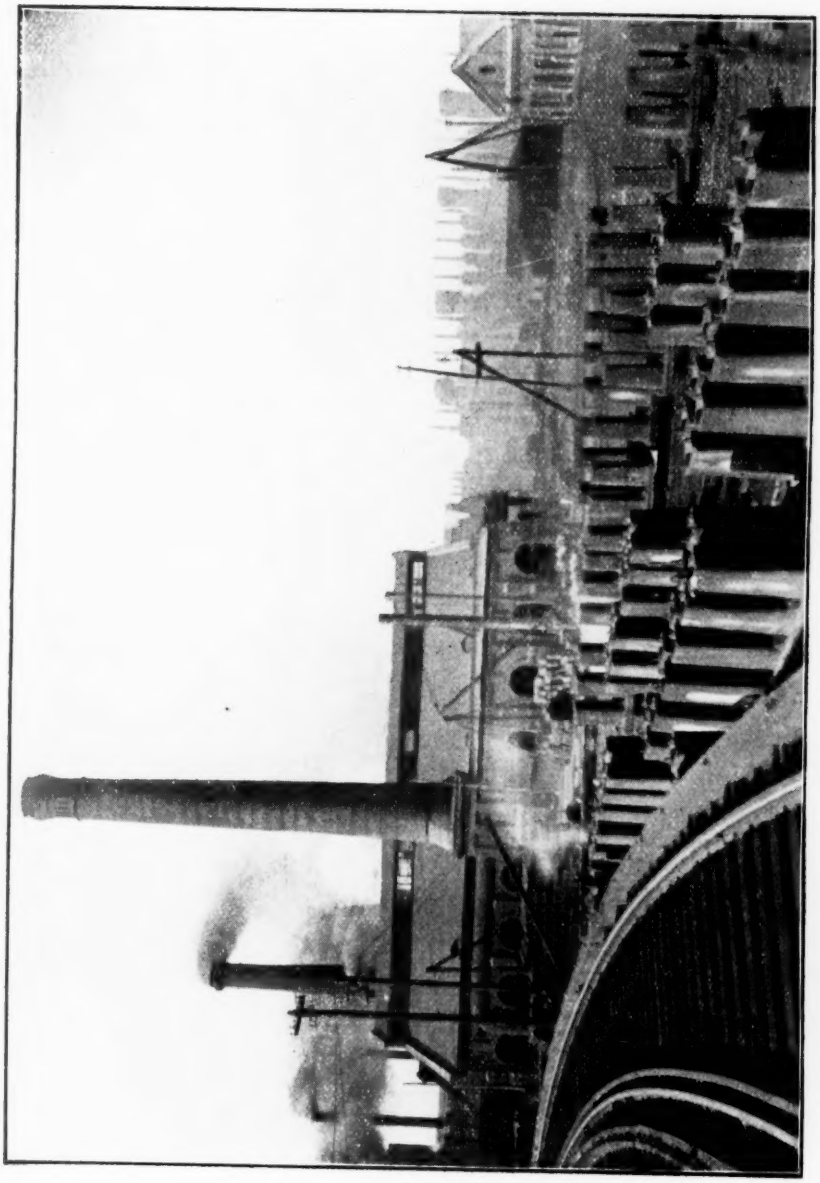
make it. He had been fortunate in getting some very nice iron and it made fine steel, but the chemical analysis of iron was then almost unknown. He gave out licenses to other Englishmen, but when they came to manufacture it it was a complete failure, and he was denounced as a fraud. At this time he engaged a chemist, George Mushet, who analyzed this iron. He found it must be comparatively free from phosphorus and very nearly free from sulphur. Mr. Bessemer's process was to blow the iron and burn out the silicon and carbon to such an extent as to leave just enough to make a good steel mixture, but did not know when to stop blowing. Mr. Mushet's idea was to blow it until the silicon and carbon was all burned out and then to melt metals containing the required properties and pour them in, thus enabling one to know the exact amount contained in the mixture. I have always felt that Mushet did not have the credit he deserved in bringing out this process. It should be called the Bessemer-Mushet process. Mr. Mushet should have received his share of the credit, and although Mr. Bessemer pensioned him for the remainder of his life time, he never conceded to him the honor he deserved for helping to finally complete this great invention. That was the commencement of using a chemist in connection with a blast furnace, and from that day on great strides have been made in the iron business and the only party who hitherto has not been benefited by it is the foundryman. He still depends on the fracture for judging iron. This is not right, as it will never enable him to tell the quality. Only to-day a gentleman showed me a long list of iron for sale ranging from 1¼ per cent silicon to 3½ per cent. He thought he could select from his line a mixture that would suit any foundryman and he could do it a great deal better than anyone could do by a fracture. He hoped, therefore, to see the day when foundrymen would order iron entirely by analysis instead of the old-time method.

Captain R. W. Hunt said in reply to the call of the chairman, that while he did not think he could say anything now that might profit those present, yet he wished to thank them all for the delightful afternoon he had in their company and for the pleasant evening he was then spending with them. The reference that had been made to chemistry touched him in a tender spot, as his early connection with the iron business had been that of chemistry and he had followed it more or less of his life and felt impressed, therefore, with the importance of the chemist and his practice in connection with the iron business. He had followed the reports of the meetings with the greatest interest in the trade journals, and had read the many discussions on different papers with great interest and profit, and thought the best evidence that most of them thought the same way was the success of the present meeting, and felt confident the organization would prosper, for the reason that it had already done so well.

The Bessemer process had been referred to by the previous speaker. Its history had been a remarkable one. It was comparatively only the other day that it was an experiment. In 1865 the first Bessemer steel in America was made in Wyandotte, Mich., in some small experimental works, and from that humble beginning came those great works, one of which they had visited that afternoon.

Owing to the fact that there were two claimants for the honor of being the original inventors, Mr. Bessemer in England and Mr. Wm. Kelly, in America, capitalists at first were afraid to touch it, but after a while when both parties had pooled their interests it went rapidly ahead. Those who saw the present perfect process moving along from beginning to end without the aid of human hands apparently touching it could but little appreciate the trial and difficulties of the earlier workers. The pig was put into the cupola. This as applied to the Bessemer industry was the American idea. In all foreign countries, especially in Sweden, the iron is melted in air furnaces. It takes from three to four hours to melt the charge and it was the English engineer who suggested experimenting with the iron in the furnace. It was not entirely a success owing to the cupola being very small, but it was proven that it could be done were proper cupolas built.

The present cupola working to-day in the Bessemer plant melts at about 1 to 11, which of course is somewhat better than could be accomplished in ordinary foundry practice, the cupola being very large and running the best part of a week.



VIEW OF CASTING HOUSE WITH INGOT MOLDS IN FOREGROUND.

Mr. Potter referred to the danger of operating blast furnaces. He was reminded of this by the death of his old friend, Capt. M. R. Jones. It had been said that it was perhaps another instance of a general being shot in the picket line, because he was not absolutely called upon to be at the post of danger. But he was very constant and devoted to his duties and to the interest of his employers, and was never happy unless present whenever a furnace was not working well. He and Capt. Jones were thrown together in the early days. They were making iron rails and thought one hundred tons in twenty-four hours was very satisfactory work, while to-day they are making twenty-five hundred without anybody touching the metal, this being all brought about by the application of brains, thought, science and chemistry. The process had been cheapened far more than had been originally thought possible, while the quality of the product was also very good. It had been said that it was not as good as the old-time steel because it was made of poorer metal, but the fact was they could now take cheaper and poorer material and make better products just as by taking a poor individual and by education making him a better man. He was delighted that foundrymen were turning their attention more to the study of their particular business and while it was not possible for small establishments to have all the advantages of the larger ones, yet coming together and comparing notes they could absorb to themselves the results that are obtained in the greater establishments. He thought nothing had done so much towards accomplishing the wonderful results in scientific and mechanical lines as just such associations as this one.

In this country these associations had accomplished wonders. Personal thought and experience had helped one another, and in helping each other the individual himself had been helped, because two men cannot come together and compare ideas without each being benefited. It is never good to build Chinese walls around us. While a man has got himself housed inside of it, he cannot see behind his barricade and he becomes as narrow and contracted as the limits of the wall.

Major McDonald said that possibly everyone present had heard of the man who was very profane and one night while driving a team met with an accident. A large crowd drew around to hear him swear, and when he saw the crowd he said, "I am unequal to the emergency." That was the way he felt—he was not equal to the emergency. He liked the remarks that were made on the subject of chemistry. His own personal knowledge had been derived entirely from hard work. It was not possible for the foundry to have appliances possessed by Bessemer plants. Capt. Hunt said it was the cheapest way to melt iron. He looked forward to the day when foundrymen will make a good iron casting with the same accuracy as the steel man does. He will have the material and call upon the chemist to give the analysis and then he will know just what to do to bring about the desired results. He was looking forward to that day and working to that end when the foundryman would know how to go back and reproduce the same thing that he did the day, month or year before.

Mr. Cope, of the Iron Age, in response to a call of the chairman, said his position reminded him of a little story, of which many present might be familiar. A certain minister at one time was confronted with a heterogeneous audience and came to the conclusion that he would deliver an address that would be fitted to all his hearers, so he announced that the text would be found in a certain chapter of Matthew. He looked over his audience and said, "and the sheep shall be separated from the goats. Then he looked again and said, "and who will be the goats." He waited a minute and evidently no one replying he said again the second time, "and the sheep shall be separated from the goats, and who will be the goats?" Not receiving any response he said the third time, "and the sheep shall be separated from the goats, and who will be the goats?" After a pause a large Irishman who thought this was getting a little personal, arose and said, "Mr. Minister, if it is all the same to you, let the game go on and I will be the goats." That was the way he felt when the President called upon him to speak. He thought he would let the game go on, and if necessary, he would be one of the goats, yet at the same time while he approached the condition with some degree of familiarity, he did not feel quite in the same position as the individual

did who was brought into the police court to be tried. He knew he had been out the night before, but did not know exactly where. The judge said, "Pat, what were you doing last night?" "Well," he said, "please, your honor, carrying home a bird cage." "A bird cage? This officer said you were on a drunk and carrying a jug." "A jug was it, your honor, I thought it was a bird cage." "What made you think it was a bird cage?" "Well, I am sure there were as many as twenty or thirty swallows in it."

While down at the steel works he had been impressed with the fact that the work done by the foundryman was an important factor and was likely to be overlooked. Much of the work was started in the foundry and the foundryman had just cause to be proud of it, and notwithstanding the great geniuses that had developed the Bessemer process it would not have amounted to very much if there had not been a few foundrymen around to help out.

Major Pickands, in responce to the chairman's call, stated his entire sympathy with the Foundrymen's Association and expressed himself surprised that they had not organized similar organizations many years ago. He recited an instance that occured some thirteen years ago when working iron in the Lake Superior region. I was making a No. 1 Pig and was much annoyed and worried by the appearance of a white spot on the fracture of the pig iron. After consulting chemists and metallurgists, he was advised that it was owing to the lack of silicon, and from that time forward he had given the subject of silicon much of his attention, and now realized that those earlier experiences had resulted greatly to his advantage. He felt sure that the comparing of notes and discussions arising from associations such as these would be productive of the very greatest amount of good.

Mr. Potter said the remarks of Major McDonald reminded him that he was once a foundryman, and recited an interesting instance of his own experience. When the Bessemer process was first started at South Chicago they were very anxious to have a foundry for making thier ingot molds, and were told that if they could build a foundry for $2,000.00 they might do it. After the foundry was completed the money gave out, and they were left without a cupola. It occurred to him at that time that he might blow the metal in the converter entirely for a little time, doing without a cupola. He thought it was an experiment that had been tried before, but he knew it could be successfully done and that any kind of iron could be got out of the converter that was needed, thus opening up a very large field in foundry practice.

Mr. Sercombe drew attention to the fact that foundrymen usually appear to advantage in the foundry. He always appeared at home in the management of his establishment or in the performance of his duties contained therein. He had never understood before, however, that they were proficient after-dinner speakers, but he had that night learned that the contrary was the case.

He had enjoyed the afternoon trip very much and also the gathering he saw present. He saw many strange faces present, and wished as far as possible that they would put in their application for membership, and made a strong plea to that effect in favor of those who were not members becoming affiliated with the association.

Mr. Moore, of Joliet, being called upon, said that one thing had struck him especially during the afternoon trip. He noticed that the iron ore was bought and paid for on the basis of chemical analysis. It was put into a blast furnace with coke that was analyzed. Lime stone was put in that was analyzed, out of the furnace came slag that was analyzed, from the top of the furnace came gas that was analyzed, and the furnace was lined with brick that was analyzed, and when the casting was taken from the mixture, that also went through the same process. While they were pouring these heats a test was taken, and the little test ingot had a physical test and a chemical test before it was cast into rails.

Through the whole process, from beginning to end, the laboratory was the key to the whole situation, and from the standpoint of the foundryman, it seemed to him there was nothing that could so profitably engage their attention as the subject of chemical analysis. The steel man employed the chemist because they could not exist without him. The foundryman has not hitherto employed him, because he had not deemed him a necessity, but as Mr. Bessemer and his business was saved by the use of a chemist, it seemed

to him that the foundry business would also be benefited by the more frequent application of chemistry to every day foundry practice, and concluded with an earnest appeal on behalf of foundrymen generally to give this subject more attention, pointing out that the trip they had taken that afternoon should serve as a great object lesson to prove its value.

Mr. Snow expressed himself as feeling very diffident about saying anything in the presence of such well-known authorities as were there, and recited the story of the man who discovered something wrong with his engine and sent for an expert to remedy the evil. The expert, after looking at the machine for a few minutes, touched some particular joint or bolt and everything went smoothly, afterwards sending in his bill, one hour's work, 50 cents; knowing how, $25.00; total, $25.50. Mr. Snow said he wanted to become a member of this association in order to "know how," as he felt that he could pick up a great deal of knowledge that would be of much benefit to himself, and thought the trip they had taken and the experiences of the evening had been the most enjoyable that he had ever spent in his life.

Mr. Sorge, with Frazer & Chalmers, thanked the chairman for calling upon him. Said he was not a member of the association, but felt much interested in what had been seen. They were using a chemist as far as possible in their establishment and found it of great value. They produce their iron entirely from analysis, mix it from analysis, and knew they could at any time reproduce results that they have had before by that method.

Mr. Sweeney said they had heard from some of the best authorities that in the iron business great changes were continually taking place, even in the foundry line, as he could remember when it was necessary to put the blast on before putting the tuyers in the cupola. He had been from the beginning a strong advocate of the necessity of chemistry in the foundry, and would always remain so. He had discussed the subject at great length in the meetings of the association, even at the risk of, he was afraid, tiring them out. He felt sure that what had done so much for the steel business would accomplish like results in the foundry. It was quite important for foundrymen to know not only what chemical ingredients should be put into the cupola, but also the nature of the product. It was a matter of importance that all should know exactly what is in their castings, and he felt sure a more thorough investigation of the subject would pay them.

Mr. Wheeler spoke of the great pleasure it gave him to have the opportunity of taking those present down to South Chicago. He referred to the great changes that had taken place in one year in the iron business, and predicted great results in the future through the aid of chemistry. After tendering to Mr. E. C. Potter a vote of thanks for the very interesting paper he had given them to be read, the meeting came to a close with some remarks from the chairman, thanking all those present for their attention, and trusting they had enjoyed themselves.

Among the Foundries.

The Weir Stove Co., of Taunton, Mass., are reported as about to resume operations.

Report says the Southern Brass & Iron Co., of Knoxville, Tenn., are very busy.

The Foster Stove Works, of Ironton, O., have started up with a force of twenty molders.

Fackler & McMullen, of Ft. Dodge, Iowa., will move in their new foundry as soon as possible.

The foundry connected with the Waterous Engine Works Co., of South Park street, St. Paul, Minn., will be 150x50.

The Glamorgan Pipe & Foundry Co., of Lynchburg, expect to have their new plant ready for occupancy by October.

Notwithstanding reports to the contrary, the plans for the Sessions Foundry, Bristol, Conn., will not be ready until next spring.

The N. M. Neal Foundry Co., of Auburn, N. Y., are putting in a substantial floor of clay, rammed and rolled and covered with molding sand.

The Model Heating Co., of Middletown, N. Y., are increasing the capacity of their Philadelphia foundry and are adding several molding machines.

The Smith & Anthony Stove Co., at Wakefield, Boston, Mass., have resumed operations with about forty molders. Their brass department, although open all summer, has not been running as full-handed as usual.

Geo. M. Sargent.

Mr. George M. Sargent, the genial whole souled President of the Western Foundrymen's Association is a native of the State of Maine, having been born in Sedgwick, Me., March 29th, 1820. In 1850 he was clerk in a general store for his brother and later his partner. Afterwards he went into the general shipstore and chandlery business, in Boston, Mass., under the name of Durham and Sargent. Although Boston has the reputation of being quite a good sized town, possessing especially at that time fairly good business opportunities, our friend Mr. Sargent was looking for something bigger and was not to be satisfied with anything short of New York, where he removed in 1861, going into the same line of business, under the firm name of Thayer & Sargent. Here he remained and prospered for ten years, when the articles of partnership expired he came west on account of ill health caused by overwork, and fortunately for Chicago cast his fortunes with that ambitious city.

In 1876 he laid the foundation of his present business by organizing the Congdon Brake Shoe Company, which ran successfully until March, 1893, when it was changed to the Sargent Company, of which he is the President. Their works are located at Chicago and Western Indiana Railway, a whole block being occupied by their extensive iron and steel foundries. Their business, which consists largely if not almost exclusively of railway supplies and castings, in both iron and steel, have grown wonderfully during the past five years, until now they have one of the best equipped establishments of the kind in America, possessing many modern conveniences for the economical production of their specialties.

GEO. M. SARGENT, Pres. Western Foundrymen's Association.

Since Mr. Sargents connection with the Western Fonndrymen's Association, it has

grown and prospered as it had not done before, due no doubt largely to the interest he takes in its proceedings.

Of an especially kind and affable disposition and possessed of that rare grace of making everyone feel at ease with whom he may come in contact, besides making an ideal presiding officer, The Western Foundrymen's Association is to be congratulated upon the President.

A Good Article.

Hyatt, Mathews & Co., of Cincinnati, seem to be deservedly proud of the reputation possessed by the Princess iron, and judging from the long list published of users of it, many of whom it is claimed have used it as a leading brand ever since it was brought out, it would seem that it was equally as popular with the foundry trade. As a coke iron it is claimed it has no equal, having been used on all classes of work from the heaviest to the lightest, where strength and softness were required. The United States government would seem to be the principal users of this brand where especially good service has been required. It is claimed that they have used this iron for many years, especially large quantities going to the Brooklyn navy yard and when outside contracts have been made the government has specified that "Princess" should be used. In several of the recently built large battle ships the steam cylinders were made of it. Under date of September 13th Mr. D. S. Cook, owner of the furnace at Glenwilton, Va., reported the receipt of the large order from the government that came unsolicited. A recent letter to hand from a government official seems to be as convincing as it is amusing owing to the very clever way in which the writer gives it the highest recommendation while apparently trying to avoid doing so.

The Very Latest.

The Gobeille Pattern Company, of Cleveland, O., have always been noted for being as artistic in their advertising as they are in their pattern designs and that a very general impression should exist to the effect that both are in some way closely connected and associated with each other is not to be wondered at. Their latest comes in the shape of a very neatly printed circular letter dated Paris, France, September 1st, and directed to the stove manufacturers of the United States. It advises them that the art centers of France are being searched for the latest and best inspirations in the way of original and artistic designs that later on will be at the service of the stove manufacturers of the United States.

Americans have long had the reputation of desiring none but the finest and if they have hitherto found that European artists produced the best of everything from paintings to millinery, it is only safe to predict that they will soon be satisfied with nothing less than the latest European designs on their stoves.

Across the Water.

The four hundred and eighty-second monthly report of The Friendly Society of Iron Founders of England, Ireland and Wales, dated September 1st, shows that the condition of business in England and Scotland is, if anything, but very little better than in America. Fourteen hundred and seevnty-four members of this society appeared to be out of work and drawing the society's fund on that account, while eight hundred and forty-seven appear to be idle owing to strikes in various localities.

It appears from this report that this society has 15,136 members with over $95,596 in its treasury.

The Fire Fiend.

The ornamental iron works of D. Pittit & Co., 1217 Callowhill street, Philadelphia, have been destroyed by fire. The loss is $15,000 on machinery and $10,000 on patterns; fully insured.

The foundry and machine shop of L. E. Hoyt & Co., in Walton, N. Y., was discovered to be on fire early on Saturday morning. The molding room was burned and considerable other damage done, but the firemen had the fire under control not long after it was discovered. The insurance, $1,200, it is thought, will cover the loss of the building, but not that of the patterns and other valuable contents.

The iron foundry and machine shop of W N. Emery & Son, at Franklin, Pa., was badly damaged by fire. Loss, about $4,500; partially covered by insurance.

The Dropped Casting.

When you're picking up your gaggers
From off your casting's top,
If there's any of them won't come loose
You can bet you've had a drop.

And if a drop you find it is,
Don't dig and poke around,
Or you'll draw the attention of the boss
Before he gets around.

Just turn the casting gently
O'er into the mash near by,
With the dropped side of it under
And the other towards the sky.

Then off and tell the boss your sick,
That your stomach's out of gear;
Then get your hat and coat and pail
And go and get your beer.

Foundry Mention.

The Linn Iron Works, Birmingham, Ala., are busy.

The Van Buren Wormer and the Albany Stove Works have resumed operations.

James Morrell is the name of the proprietor of a hustling foundry and machine shop in Van Buren, Ark.

Carr & Wiggins, of Little Rock, Ark., have adopted electricity as a motive power in their foundry and machine shop.

Mr. Crider, proprietor of the Butler, Ind., Foundry, reports plenty of work on hand and a good force of men at work.

C. D. Marr, of the Fremont, Neb., Foundry & Machine Co., returned from Fullerton where he captured a $5,000 waterworks contract.

Mr. Edward N. McKinney, of the firm of James McKinney & Sons, reports business in the architectural line as being unusually brisk.

R. P. Hall, manager of the Albuquerque Foundry and Machine Shop, reports business rather dull, this being the slack season in that locality.

Lloyd & Co.'s foundry, at South Elgin, Ill., and Frank Rowland's machine shops were destroyed by fire recently. Loss, $13,000; insurance light.

The Algiers, La., Iron Works have recently added a foundry to their plant and the increase in their business will warrant them in making some further addition to their plant.

The Standard Emery Wheel Co., of Troy, N. Y., are beginning to feel the effect of the improvement in the iron business and expect to run a full force of men at no distant day.

The Fulton Truck & Foundry Co., of Mansfield, O., has begun work in its new plant. The machine shop is 60 x 175 feet, while the foundry, which is yet to be built, will be 100 x 225 feet.

The Moline, Ill., Pump Co. is enjoying the greatest rush of business in its history. In the foundry they commence today taking off a heat every day, the foundry being crowded to its full capacity.

The Farrell Foundry & Machinery Co., of Ansonia, Conn., will soon begin the erection of a brick building with iron roof, to which will be transferred the heavy chilled roll department. The foundry will be 250 x 100 feet.

The Homestead (Pa.) Manufacturing Co. will begin the erection of a plant on Fifth avenue, in that city. It will consist of, besides the machine shop, a brass and iron foundry, pattern shop and repair department.

F. A. Williams, secretary of the Girard Stove & Foundry Co., has mailed the following notices to the stockholders: "There will be a special meeting of the Girard Stove & Foundry Co. at its office in Girard, O., Tuesday evening, September 18, at 7:30 o'clock, central time; at which meeting a resolution to increase the capital stock from $20,000 to $50,000 will be presented."

The Bass Foundry & Machine Works, Ft. Wayne, Ind., are now engaged upon the construction of an immense truck to be used in moving heavy castings. It recently required four days to move from the casting room to the machine shop a piece of a drive pulley weighing twenty tons. They are five more pieces of the same weight to be moved. The ponderous new truck will enable this to be done in a few hours.

The Chattanooga Car & Foundry Co., of Chattanooga, Tenn., will very soon begin to make about 200 cannon carriages for the Chattanooga and Chickamauga National Parks. H. L. Arnold, the pattern-maker of the foundry company, has been to the Gettysburg Military park to make copies of the gun carriages there, which are of the regulation army pattern of the civil war, and which design will be used here. The carriages will cost $70 each. By the time they are done, Gen. Boynton will be here to help locate them on the park.

THE FOUNDRY

A TECHNICAL JOURNAL DEVOTED TO FOUNDRY INTERESTS.

Published Monthly by

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THE FOUNDRY is issued promptly on the tenth of each month, and will spare no endeavor to furnish valuable news and information to those interested professionally or incidentally in molding, melting, mixing of metals, foundry management, etc. Persons connected with any of these lines of industry will confer a favor upon the Editor of this Journal by sending him news from their section of the country pertaining to the foundry interests, particularly individual theories and experiences of practical value.

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The Trade Outlook.

Business is getting better in spite of the calamity howler.

The Foundry sincerely believes that the greatest enemy to prosperity in this country at this minute is the pessimistic, dyspeptic, bilous individual who is permitted to run at large and predict all kinds of disaster as a result of this or that political policy or measure.

If he is a Democrat, he sees ruin and wholesale misery as a result of a possible return to power of the Republican party; and if a Republican, he thinks that all present evils, together with greater ones to come, result directly from the continuance in power of a Democratic administration. The home for incurables should be the permanent abiding place for all such public enemies. Rogers, Brown & Co., in their weekly review of the pigiron market, give under date of October 6 a curious instance of this as follows:

"A case which fairly illustrates the prevalent feeling was that of a man placing an order at the close of the week who said that he ahd no faith in the future and had had none at any time this year, and yet the work kept coming into his foundry until he had more than he could do, and was full of contracts for months ahead. It is possible that the habit of viewing the situation from a pessimistic standpoint has become a settled one, and that manufacturers are slow to appreciate the changes that are actually taking place."

PIG-IRON seems to be holding its own, although margins are very small; but it is significant that for the first time in years lower prices are not anticipated by even the closest buyers.

Pipe foundries, as a general thing, are very busy, many increasing their water supply in some cases to give work to the unemployed. Agricultural implement works are increasing their forces, and in several lines the general improvement is quite noticeable.

The western and central States seem to be getting the best of it, although the improvement continues steady in all directions, and more orders are being booked than for any time during the past year.

The Coming Metal.

A few years ago newspaper writers were drawing upon their imaginations for material

with which to picture the changes that would shortly take place when aluminum and its uses became understood. Some of the remarkable virtues credited to this material by these optimistic gentlemen would make amusing reading if printed now when the metal is more thoroughly understood.

That the deevlopments of science in the metallurgical field is, however, doing much to cheapen some of our metals and develop others, all will readily admit, and it is conceded by all who have given the subject thought, that the reformation in this line has but just commenced.

The stone age, the copper, bronze and iron age have been with us, and it is claimed that the present can be appropriately and correctly called the steel age. Foundrymen especially will be ready to concede this latter claim, as castiron has been superceded by steel in so many ways, notably the creation of large, modern buildings in which the use of castiron has been supplemented by steel almost entirely.

Advanced thinkers, however, are predicting that steel, in its turn, is shortly to be supplemented by nickel-steel. No authority could be quoted that would have more weight than Thomas A. Edison, and he puts the matter concisely as follows: "Gold is only valuable because it is rare. It is not nearly as useful as iron, which is the real precious metal. Aluminum is too soft. It is light, but it lacks strength. The metal of the future is nickel, steel, which combines strength with pliability. Gold is not worth as much as lead in commerce, and bross is more than worth its weight in gold."

Then, again, we noticed the following in a recent issue of the Age of Steel:

Though nickel was used for coins two centuries before Christ, it is only recently that the discovery of the remarkable properties of its alloy with steel has brought it into general commercial prominence. The tensile strength of this alloy—nearly one-fifth greater than that of ordinary steel, while its ductility remains the same—will doubtless cause it to supplant common steel in many places where great strength is required. For instance, the American-Atlantic Liner City of Paris, has been supplied with a spare length of shafting of this alloy. It is said that this casting has a tensile strength of about 90,000 pounds, thus leaving existing British or German steel shafts quite a respectable distance in the rear. The production of nickel has increased within ten years from 1,000 tons per annum to over 5,000 tons, while before 1876 not more than 600 tons were produced in any one year. The most notable increase has been in the manufacture of nickel steel, ostensibly for armor plates and guns, but it is not likely that its use will stop here, especially as the price tends steadily downward.—The Age of Steel.

Judging from the foregoing, all that is necessary is a further cheapening of cost, and we will have a metal whose combined strength excites the greatest admiration in common use.

Well This is Rich.

Our enterprising contemporary, The Iron Trade Review, in its issue of September 13th, publishes a printed editorial entitled, "The Question of Business Morals." Some little incidents that had been brought to our notice caused us to peruse the aforesaid article carefully and curiously with the view of learning that paper's exact sentiments on the subject of morals or lack of business morals among business men, and possibly among newspaper men. Our curiosity had been somewhat aroused on this subject owing to our attention having been drawn to some of the methods of that paper that we felt sure it would find it difficult to reconcile with a strictly honorable business policy.

In its zeal to increase its influence and patronage letters had been written to advertisers containing the statement that the Iron Trade Review is the official organ of the Western Foundrymen's Association, etc.

Similar statements are reported to have been made by a representative of the paper in different localities, but we let that pass, as the letters (one of which lies before us, sent to a well-known advertiser), are sufficient for our purpose.

Now, The Foundry admires enterprise, as well it might, having by the display of that necessary article to a limited extent become one of the leading trade papers in the country of its kind in two years of hard times, in fact being, it might be said, entirely without any competition in its particular field. But we feel as if it is a duty we owe ourselves as well as trade journalism to protest against the Western Foundrymen's Association being used as a handle to advance private interests.

It would be bad enough if the Association had made any such arrangement with the Review, but nothing of the sort had ever been or is likely to be done. Consequently the statement that it is the "official organ" and the inferences that followed, are as false as they are ridiculous.

The trade press generally, especially those devoted to the iron interests, have given much of their space, spared no pains to advertise and advance the interests of the associations both east and west without any selfish thought whaever beyond a desire to serve their readers. Further than that editorials have been written and money spent with a view of aiding this most commendable work, and for one paper to endeavor to use the good name of one of these associations in such an unauthorized manner for its own benefit is certain to meet with the condemnation of all the well wishers of that organization, besides being ungraciously unfair to other trade journals.

To be free and independent should be the ambition of any newspaper and it seems to us that a little foresight would convince the editor of any journal that it would be more to his interests to remain unmuzzled than to be an "official organ" and wear a collar.

Especially is this true in the case of an association that reported at its annual meeting that it had less than seventy-five members all told, including those in arrears.

We do not suppose The Review will care to deny the correctness of any of these statements, as such would only compel the publication of some proof on our part that they might not care to go broadcast.

If the Western Foundrymen's Association wishes to achieve that measure of success so much desired by its friends, it will not only keep itself clear of any entangling alliances, but see that its name is not used without its authority.

10 Per Cent. Quarterly.

Our old friend, Hartsfeld, is at it again. This time he is organizing a company to engage in the smelting and refining business in East St. Louis, Ill., on a large scale under the name of the Denverside Smelting & Refining Company. This is O. K., and we hope he succeeds, but unless he transacts his business in a more honorable method than hitherto, there is likely to be a number of people in that neck of the woods sorry that they ever heard of him.

He advertises his stock as being worth $70 a share, dividends "10 per cent quarterly."

THE FOUNDRY hopes that its St. Louis readers will be careful.

The Scrap Heap.

The winter months are now fairly at our doors, and by the time this issue of THE FOUNDRY is mailed a most unpleasant season of the year in the iron foundry will be rapidly approaching. It may not be amiss at this time to refer briefly to the great carelessness shown by most proprietors, who are usually regarded as competent managers, in permitting a state of affairs about their establishments in the winter season that savors of the grossest mismanagement. Windows need repairing, heating appliances are neglected and frequently every opportunity is offered the most inclement weather to find its way through foundry walls to the molder at his work.

* * *

The familiar remark that "anything is good enough for the foundry" might have done in the old primitive days, but in these times of close cometition there is no place where the best is needed more than in that same foundry, and the manager who permits his employees to attempt to work in a chilly, damp atmosphere is destined to see his ledger balance on the wrong side.

* * *

No place could be more uninviting, as a place of employment, on a winters morning than in a cold iron foundry, and nothing will bring a more disagreeable sensation to the ordinary molder than the thought of being compelled to work with half frozen sand in a chilly atmosphere, his usefulness is impaired 30 per cent. and his employers lose that much more in other ways.

* * *

Some of the readers of THE FOUNDRY may have noticed at times the proportion of origina. matter appearing in this paper compared with that published by some other trade journals, and some may have again noticed the number of original illustrations that appear regularly from time to time in its columns.

* * *

While not desiring to be the hero of our own story, yet we feel it not out of place to mention

that we hope to from this time forward make our pages still more attractive than they have hitherto ever been.

* * *

We are counting the cost and believe it will pay in the end, although the trouble and difficulty connected with endeavoring constantly to discover something new that will interest and please is one of the main difficulties connected with publishing a paper of this class.

Among the Foundries.

Burdett, Smith & Co. foundry, of Troy, N. Y., resumed on September 1st.

The American Steel Foundry Co., of Granite City, Ill., will soon begin operations.

Work is progressing rapidly on the Kansas City Car & Foundry Co., of Armourdale, Kan.

The Alabama Pipe Co., of Bessemer, Ala., are shipping a car of cast iron water pipe per day.

The Scottdale (Pa.) Iron & Steel Co. has just added a No. 4 Whiting cupola to its equipment.

The foundry of Burdett, Smith & Co. started up August 27, the first cast being takes off on the 28th.

The Nubia New York Foundry has been rented and will be put in operation by H. W. Galentine.

The old foundry at Albia, Iowa, has been sold to parties who will turn it into a corn cob pipe factory.

The Kansas City (Mo.) Car and Foundry Co. will add a rolling mill to its plant at Armourdale, near Kansas City.

H. B. Husted, operating a foundry on a general run of jobbing castings at Shephard, Mich., is reported busy.

The efforts made toward reorganizing the Rogers Stove Foundry on the co-operative plan have been given up.

The new foundry of the Enterprise Co., Oakland, near Belleville, Ill., are to begin operations as soon as possible.

The Cambridge Foundry Co., Cambridge, O., have the contract for making the castings for the Morton Tin Plate Co.

The Donaldsonville Foundry & Machine Shops, of Donaldsonville, La , report business much above their expectations.

The Giesy Foundry & Machine Co., of Salt Lake City, have their building about completed and will soon be ready for business.

J. A. Peeks' new foundry at West Plains, Mo., is about completed and he expects to take off the first heat by the 1st of September.

Large numbers of men are finding employment in the foundry department of the Michigan Peninsular Car Works at Detroit, Mich.

Ford & Donnelly, of Kokomo, Ind., will erect a branch factory at Montpelier, Ind., owing to a largely increased demand for castings, etc.

The Memphis Car & Foundry Works took off their first heat recently, starting on a large order of cars for the K. C , Ft. Scott & Gulf.

A shipment of 4,000 tons of pig iron to the Arminston Pipe Works, Armiston, Ala., has been recorded from the Birmingham district.

The old board of officers of the Gartland Foundry Co., of Cleveland, O., were re-elected at an annual meeting which was held recently.

T. P. Miller and W. B. Beard, of Abbesville, N. C., have leased the Monroe (N. C.) Foundry and Machine Works and will operate the same.

The Florence (N. J.) Iron Works have again been put in operation after being idle one month, caused by the burning of the foundry's plant.

The Gates Iron Works, of Chicago, are preparing plans for a new foundry. The plant will be equipped with the most modern machinery.

Woodruff's Foundry at Elgin, Ill., is running with about three-fifths of the regular force of hands. Lack of material is the cause of the partial shut-down.

The brass foundry of W. T. Garratt & Co., of San Francisco, Cal., have recently successfully cast a magnificent bell for the Board of Education of Vallejo, Cal.

The Eden Iron Works, at Lancaster, Pa., have been leased by James C. Donnelly, of Altoona, Pa., who will put them in operation, after being idle for several years.

The Lyndon Foundry has succeeded the Thos. Bailey & Co. foundry, of Athens, Ga., who have dissolved partnership and transferred their business to the former concern.

The National Pipe & Foundry Co., of Scottdale, Pa., has purchasee the plant of the Charlotte Furnace Co., at that place, together with fifty-two acres of adjoining ground.

The Brampton Foundry, Winnipeg, Man., has been sold to a local company for $6,000 who have agreed to employ twenty-five men for a period of 10 years.

S. Cheney & Sons' Foundries at Manluis, N. Y., are being run to their utmost capacity and are unable to keep up with orders without working a portion of the night.

The wild rumors which have gone the rounds of the press regarding the mysterious secret meetings and movements of the Vapor Stove Manufacturers have come to naught.

The Norwalk (O.) Foundry & Machine Co. states that the foundry is running well on a large order for castings for the W. & L. E. R. R. Co., which, with other work, keeps it busy.

Wm. Sellers & Co., of Philadelphia, Pa., have placed one of their 20-ton cranes in the Mt. Vernon street power station of the Philadelphia Traction Co. and are now making two more of like capacity for the same company.

The Missouri Car & Foundry Co., of St. Louis, Mo., is well employed on orders for coal cars from all parts of the west, Orders have been received from the Paducah & Memphis line and from the Belleville (Ill.) Railway Co.

The Whiting Foundry Equipment Co., have recently shipped a No. 3 Whiting cupola to Snow & Williams, Delphos, O., a No. 1 to the Griffin Car Wheel Co., Chicago, and a No. 3 to the Escanaba Iron Works, Escanaba, Mich.

The Glamorgan Pipe & Foundry Co., of Lynchburg, Va., is now the title of the old Glamorgan Company, whose plant was destroyed by fire some time ago. The new plant is nearing completion and is expected to be ready October 1st.

The St. Louis *Star Sayings* of August 20th have started another rumor in regard to a mysterious meeting of stove manufacturers with a view to forming a trust. Verily the brain of the newspaper reporter is as imaginative as an aggregation of wheels can make it.

The Birmingham (Conn.) Iron Foundry has awarded contracts for the erection of a new foundry building. It will be a brick structure occupying a space of 168 x 76½ feet, with an "L" to take the cupolas, cupola-staging and core rooms. Six 15-ton power cranes, hydraulic elevator for handling coal and iron, new roll pits, core ovens and scales will be put in and will be of the latest pattern.

Fire Fiend.

Fire destroyed Lloyd & Co.'s foundry, South Elgin, Ill.

The old Filley Foundry, Troy, N. Y., was totally destroyed by fire. Loss, $10,000.

The Beashy Foundry, New London, Wis., was burned on August 14th; loss, $1,500.

J. C. O'Brien's foundry, 78 North May street, Chicago, was damaged by fire on August 6th.

Fire slightly damaged the foundry of John Curran, Church and Robinson streets, Wilmington, Del.

A fire doing slight damage was discovered in the wood pattern shop of Bussey & McLeod, Troy, N. Y.

The police are now on a still hunt for the incendiaries responsible for the burning of the Iowa Falls (Ia.) Foundry.

William McCombe & Co.'s brass foundry was destroyed in the recent fire at 158 and 160 Van Buren street, Chicago. Loss, $10,000.

The Morits Foundry & Machine Shop, on the corner of Colorado avenue and Fort street, Hastings, Neb., was destroyed by fire on the 11th of August. Loss, $6,000.

At 3:30 A. M. on the 22nd of August fire was discovered in the foundry of Crowther & Rogers', Eighth and Messanie streets, St. Joseph, Mo., but was put out before any great damage was done.

Patents Department.

DATE.	NAME.	No.
July 3, '94	Sashweight, G. S. Sergeant, Greensborough, N. C.	522498
July 10, '94	Tuyere forced draft, B. F. White, Manheim, Pa.	522815
July 10, '94	Converting cast iron blanks into steel, Josephine Hooper, Louisville, Ky.	522595
July 10, '94	Apparatus for reducing, remelting and mixing metals, Heinrich F. D. Schwahn, Kansas City, Mo	522675
July 10, '94	Method of making composite car wheels, Walthan Washburn, Boston, Mass.	522633
July 17, '94	Molders' flask, S. W. Burlette	522959
July 24, '94	Sand molder's apparatus for forming, S. J. Adams, Pittsburg	523502
July 24, '94	Molding machine, W. W. Doolittle	523466
July 24, '94	Process of and bath for hardening mold plates, Lester B. Brown, Bradford, Pa.	523620

July 24, '94—Coke oven, Albert D. Shewsbury, Charleston, W. Va.....524602

July 24, '94—Coke oven, Thos. Cummings, Hartranft, Tenn.....523397

July 31, '94—Sand blast machine, John A. Shoemaker, Rochester, N. Y.....523907

August 7, '94—Art of molding, George H. Gayer, Pittsburg, Pa.....524169

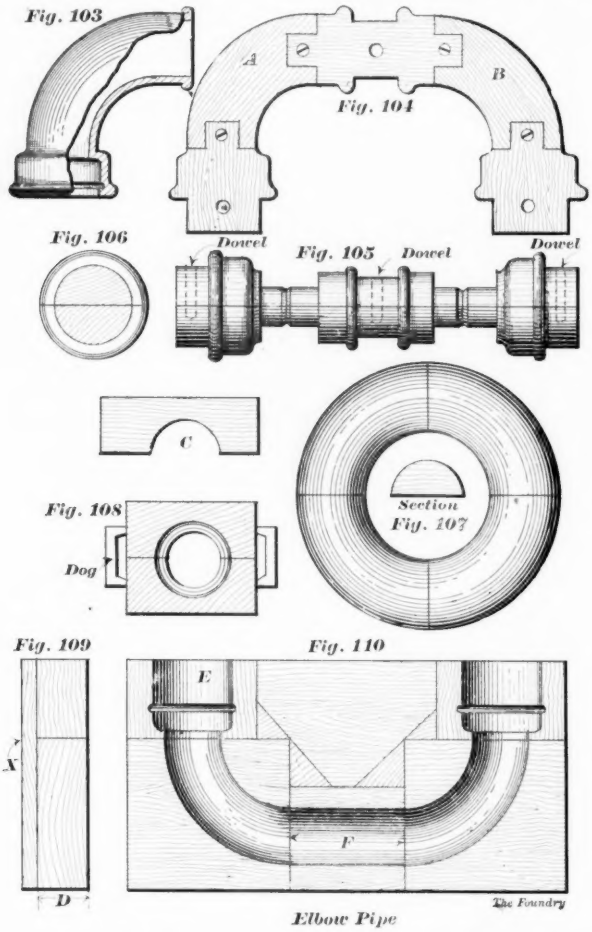
August 7, '94—Process of making molds for plaster casts, Ansil W. Monroe, Philadelphia, Pa.....524179

Sept. 4, '94—Molding appliance, Joseph B. Neff, Bushwell, Ill.....525355

Sept. 4, '94—Apparatus for casting journal boxes, Philitus W. Gates, Chicago, Ill.....525412

Sept. 4, '94—Method of tinning iron castings, August Schaag, Berlin, Germany.....525471

Copies of any of the above patents will be furnished from this office on receipt of 25 cents, give date, name and number.



Elbow Pipe

August 14, '94—Means of casting drake and green.....524543
Molding machine, Wm. B. Sterrit, Pittsburg, Pa.....524492

August 21, '94—Method of carbonizing iron, Jean Meyer, Dudelingen, Germany.....524904

August 28, '94—Art of dry sand molding, Wm. E. Wood, Brooklyn, N. Y..525040

August 28, '94—Method of converting cast iron into steel, Wm. M. Taggert, Philadelphia.....525296

Lessons in Patternmaking for Manual Training Schools.

BY P. S. DINGEY.

VII.

When making castings for elbow pipes such as shown in fig. 103, it is usual to mold and cast them two at a time, there being but

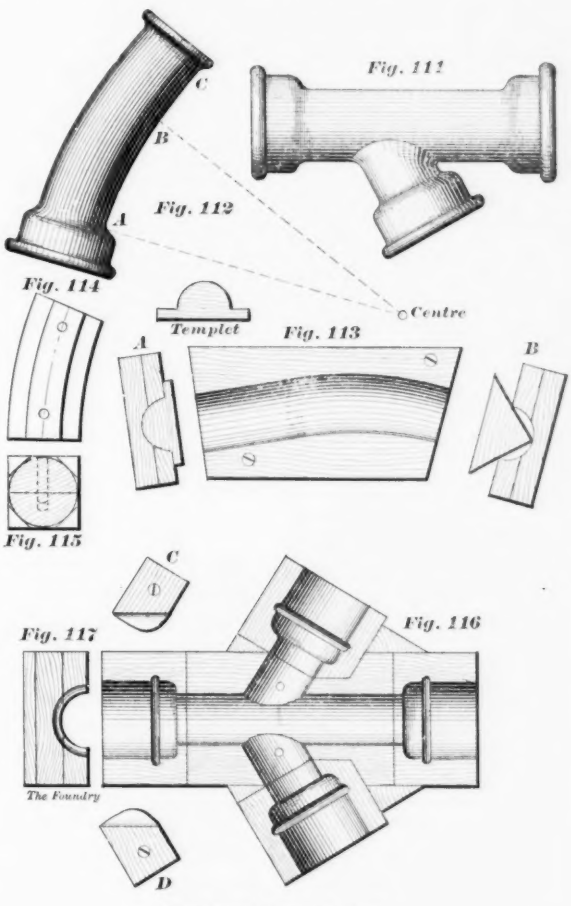
little more work in molding two than one. Two patterns of the elbow are then required, or rather, let us say, a double pattern and core-box. Referring to the illustrations it will be seen that most of the work on both pattern and corebox is done in the lathe. For this reason the amount of work is very little more for a double pattern and corebox, than for single.

Fig. 107 is a ring, the section of which is a half circle—a templet about a quarter of an inch thick as shown at C should be used to turn this ring by. After the ring is turned cut it in quarters, which will be used for that part of the pattern marked A B, in fig. 104—note the direction in which the grain of the wood runs in the elbows (fig. 104) before cutting the ring, and cut it accordingly.

Two pieces should now be prepared for turning the sockets, spigot ends and core prints all in one piece as shown in figs. 105 and 106, the latter being an end view. When doweling together put the dowels so that they shall come in the prints as marked. The tongues are for connecting the parts to elbows as represented in fig. 104.

Two views of the corebox are shown in figs. 109 and 110, fig. 109 being an end view. The box is put together in sections—the two corners which form the elbows are turned from a square block the thickness of D in fig. 109, after which it is cut in quarters, in the same manner as the ring for pattern.

The student will understand from the articles which have already appeared, that it is only necessary to build this kind of box for making just half the core, the two halves being pasted together when made and dried. This being so, it will be seen that but two of the quarters just turned are utilized. The



Bend and Branch Pipe

socket and print part of box are also turned from a square block jointed and held together by dogs as shown in fig. 108, which is an end view of the socket part E. The part F is a plain straight piece inserted between the two corners. Fig. 109 shows a bottom board X to which all the parts of the box are glued and screwed—the angle pieces seen in fig. 110 also help to strengthen and hold the box together.

The pattern for bend pipe in fig. 112 is made in sections in a similar manner to the elbow, except that the part from A to B is not turned in the lathe, but cut "by hand," as they say in the shop. I have considered it unnecessary to show the parts of pattern for the socket and straight part C of the bend, as they are made in much the same way as the sockets, etc., of the elbow, with prints and tongues turned on them. The part to be cut by hand is fig. 114, of which fig. 115 is an end view. Two pieces are jointed and doweled together, then sawed to the circle inside and outside—the center is shown where the two radial lines meet in fig. 112. A circle is now struck on each end the diameter of the outside of pipe, after which lines at 45 degrees with the sides and tangent to the circle are laid off, as shown in end view; other lines parallel to the sides are marked, as shown in fig. 114. These lines form a guide to chamfer the corners correctly; this being done, the operation of striking lines may be repeated, making the pattern a sixteen-sided figure, until all the corners are rounded off into a circle.

The corebox is shown in fig. 113 without the sockei part. A and B are end views. This part of the box is worked out by hand—some pattern makers make a templet as shown, for a guide to cut the box by, while others just use a square like shown at B. The socket part of the box is turned in the same way as one for the elbow. It will be seen that two halves are needed for this box, as two cores made from one half would not match when pasted together—the half to match it must, therefore, be made the opposite hand to the one shown.

The pattern for the branch pipe in fig. 111 is not shown, as the student should be able to figure that out for himself, after making the elbow and bend patterns. The way to construct the corebox is, however, shown in fig. 116. One box can be made to answer for the two half cores by making a socket part on each side, as shown. The two stop-off pieces C and D fit in where two small holes are marked. By arranging the box this way and using the stop-off pieces alternately, half cores can be made which will match when placed together, thus saving the expense of making two halves.

As in the case of the elbow corebox, a bottom board is used, seen in fig. 117, to which is fastened all the parts.

James Chalmers.

The Unvarnished History of a Common Man.

BY W. EDWARD.

CHAPTER X.

(CONTINUED FROM AUGUST NUMBER.)

FROM the distance we had traveled since leaving Delta, we judged that we were not less than fifteen miles from Monroe, and as the shadows were already beginning to grow long, in our weakened condition there was no hope of our reaching the Ouchita river that night. But we set our faces toward the west and trudged resolutely forward. This may seem like a small country to a man flying over it in a palace car on a limited train, but the man who attempts to cover it afoot gets a true idea of its magnificent greatness. Although probably thirty miles from the Mississippi river we were still in a country subject to its annual overflow and the mark of the muddy water on the trunks of the trees, nearly two feet above the level of the swamp, was clearly visible, except along the banks of the sloughs and rivers, which thread this swamp country in every direction, where the land is hgher than the surrounding level.

Here is the sportsman's paradise, in winter at least. The air is clamorous with the noise of every variety of song bird known in the United States, while countless thousands of ducks, geese and other aquatic birds cover the waters of the sloughs and lagoons and make night hideous with their noise. A large species of black squirrel barks and chatters from the trees overhead and

appears full of curiosity and not at all timid at sight of us. By the side of a little lake we stopped to rest and to watch the aligators, with which it fairly swarms, from tiny little things not larger than your little finger, to really dangerous looking fellows, ten and twelve feet long, who disappear into the black water at the sound of our approach.

The delta of the Mississippi is undoubtedly as fertile as the famed delta of the Nile or the great valley of the Yellow river of China, and its possibilities of sustaining life are equally as great. The soil in some places is fully fifteen feet deep and practically inexhaustable. Cotton grows on the stalk to the height of a man on horse back and will produce from one and half to two bales to the acre. When the productive possibilities of this vast overflow country are fully understood and some practical system of restraining the annual innundations of the Mississippi and of reclaiming the millions of acres of swamp land in its delta, rendering them habitable for white men, is undertaken by this government the Malthusan theories will cease to worry our scientists.

Trudging wearily along through a country as prolific in the gifts of nature as any country under the sun, we were hungry, shelterless and half naked, and the thought occurred to me, that of all God's creatures man is the most helpless when thrown on his own resources away from the association of his fellow men.

After the train had left us we walked wearily along mile after mile without hearing or seeing a sight or a sound of habitation. It was beginning to grow dark very rapidly and we hurried on in the hope of reaching some place of shelter for the night. Finally, as the ominous roll of thunder warned us of an approaching storm and we had almost given up hope of reaching a shelter before it burst on us, we spied the cheerful twinkle of a camp fire but a short distance ahead of us and could discern the shaddowy forms of two men sitting beside it. It took us but a short time to come within hailing distance of the camp and as we came closer we could see the dark outlines of a house beyond it. The two men were as much surprised at our appearance out of the darkness as we were at the sight of them but mutual explanations soon followed and an invitation to share their supper was accepted with alacrity. They, like ourselves, were on tramp, but with a different object in veiw. We learned from the younger of the two that they were brothers, that their home was in California and they were making their way on foot, having tramped the whole distance from Washington D. C. The elder brother, who had been "property" man with John McCullough, the great actor, had been attacked by brain fever and had lain for months in a hospital in Washington. On hearing of his brother's sickness, the younger had started for Washington with the intention of taking his brother back with him to California. On the way east he had been taken sick and when the train reached Pittsburg he had been carried to a hospital, where he was laid up for nearly two months with typhoid fever before he was again able to travel. When he at last reached Washington he found that his brother had been discharged from the hospital about two weeks before in good bodily health, but with a mind badly deranged from the effects of his long sickness and almost incapable of caring for himself. Then began a search for the lost and weak-minded brother, which lasted nearly six weeks, finally ending in his discovering him in the poor house of an adjacent county in Maryland, when all of his money had been exhausted in the search and he was almost penniless. Now that he had discovered his brother and taken him from the poor house, he had no means of taking care of him. The worry and hard work of the six weeks' search had almost brought on a relapse and he was in no condition for work. He was a tinner by trade and a few days after having found his brother he secured work at his trade, but was unable to stand it and forced to give it up after two days' struggle. It was then he decided to tramp home to California, not only as a last resort, but with the

hope that the freedom of the life in the open air would strengthen his brother's weak brain and bring about his recovery. When we met them they had been on the road for nearly seven months and hoped to reach California before the following winter, expecting to be about eighteen months on the road. The younger brother, being a tinner, found enough work along the road to keep them in food and tobacco and they managed to beg sufficient clothes and shoes to keep them comfortable. They were both in good health and the elder brother had so far recovered that he could converse in a rational manner, and it was only occasionally a weakness of intellect could be detected. But the demoralizing and degrading influences of their long tramp was visible in their talk and manners and I doubt very much if either of them would ever again raise above the level of a tramp.

They had a bag well filled with provisions, which had been gathered at the last town we had passed and, as they were going our direction, we resolved to join issues with them, having an eye to the commissary stores which they carried, until we reached Monroe at least. While we were finishing the supper, the two brothers gathered a good supply of fire wood and kindled a fire on the hearth of the old deserted cabin, where we made ourselves comfortable for the night, secure from the rain and storm. The next morning we resumed our journey and we soon found that our companions were in no hurry to cover the road, seeming to care little whether they made one mile or ten miles a day, so long as they could get plenty to eat. About eleven o'clock we came to a small town and were given an illustration of the way in which they hustled for the comforts of life. My partner started out with the younger brother for the purpose of carrying the commissary bag, which they expected to fill by his exertions in mending delapidated tinware. The elder brother was of a philanthropic turn of mind and was deeply grieved by the fact that neither my partner or I had pipes or tobacco. So, as soon as we reached this town, he announced his attention of supplying these necessary articles of comfort.

Left to myself I sat contentedly in the sun on the depot platform, musing over my experience of the past month and wondering when and where it would all end. In a very short time Charley, as the elder brother was called, returned with three clay pipes and two packages of tobacco, besides a very passable pair of shoes, which he immediately put on, discarding his old ones. I did not ask how or where he had secured the pipes and tobacco, being satisfied to enjoy the luxury of a smoke without asking any questions. Shortly after my partner and the younger brother returned from their quest with a well-filled bag, consisting of a corn pone, some cold biscuit, about two pounds of bacon and some coffee and sugar. Provided with some of the luxuries as well as the necessities of life, we again took up our march, keeping an eye open for a favorable place to camp and cook our dinner. Within a few miles of the town we found a deserted cabin which suited our purpose, as a storm was brewing and it looked like a wet afternoon. The cabin was a very shaky affair standing on posts about three feet above the ground, but it had a good fire place and the roof offered a shelter from the threatening rain, so we concluded to camp there for the night. We lit a fire on the hearth and gathered sufficient fire wood to keep it going through the night before the storm broke. The rain came down in torrents while we were eating our dinner and then came a sudden lull in the storm, the rain passing away as quickly as it had come. The sky cleared quickly, but a moaning noise in the trees warned us that the storm was not passed. In a few moments the sky assumed a coppery hue and the wind began to blow, increasing in violence every moment. Our cabin rocked so much that we decided the safest place for us was on the railroad. We had hardly reached the railroad when the storm swooped down on us, shrieking alike a million demons. In an instant the cabin we had just left was lifted from its supports and torn to fragments, great trees were twisted from their roots and the air was dark with flying leaves

and branches of trees. Luckily there was a wide clearing surrounding the cabin and none of us were hurt by the flying branches, although we had to lie down and clutch the rails to keep from being blown away.

The storm passed over in a moment, but the sky became overcast and it began raining again. Deprived of our shelter, we were compelled to walk on in the rain. As it was beginning to grow dark we arrived at a small station just as the west bound freight pulled in. We managed to climb into a box car unobserved and in less than an hour we arrived in the yards at Monroe. We waiked around the town for some time trying to find a place to dry our clothes, as we were wet through, but we were unsuccessful. In skirmishing around we found a covered space behind the depot where we concluded to try and pass the night, but it became so cold toward morning that my partner and I were compelled to crawl out and warm our benumbed limbs with exercise. Some time before we had heard the hoarse whistle of steamboat and we turned our steps in the direction of the levee to see if there was any chance for warming ourselves.

We found the steamboat to be the Corona, bound up from New Orleans to Camden, Ark. The crew were busy unloading freight and we clambered aboard to warm ourselves alongside the boilers. It was while watching the unloading of this boat that I saw a deliberate murder and yet, I could not but think the murdered man merited death. He was the mate of the boat and certainly one of the most brutal men I ever saw. He stood on the shore end of the gang plank shouting and swearing at the roustabouts, accentuating his remarks by an occasional blow over the head of some unfortunate "rouster" with a big hickory club which he carried. I noticed that there was only one white man among the roustabouts and the mate aeemed to be especially severe on him, cursing him at every step and occasionally prodding him with the club. In going up the slippery gang plank with a heavy bundle of cotton-ties on his shoulders he was jostled by one of the men coming in and, losing his balance, the cotton-ties went overboard and the man was only saved from following them by clutching a guy rope. In a moment the mate was on him like a fury, cursing him for his awkwardness and beating the helpless man over the head and shoulders. I looked for the other roustabouts to interfere, but they paid no more attention to it than if they were so many automatons. As soon as the poor fellow was able to struggle to his feet the mate ordered him to get his money and get out, threatening to kill him if he was not off the boat in five minutes. As he passed us on the way to the clerk's office the blood streamed from numerous cuts on his face and head and there was a dangerous look in his eye, but he got his money and slunk off the boat without a word to anyone.

About ten minutes after he had left the boat I saw him climb up on a pile of freight directly above where the mate stood and almost before I divined his intention he stood up and hurled with all his force a heavy iron crow bar down on the mate. The bar caught the mate between the shoulders, passed almost through his body, while the force of the blow threw him into the river. It had all happened so quickly that I had no time to cry out and when I looked up again, after watching the fall of the mate into the river, the man had disappeared.

In a few moments the body of the mate was fished up out of the river and carried up the levee to an undertaker's. The second mate took his place on the gang plank and the work of unloading was resumed as if nothing had happened. The boat did not even wait for the formality of an inquest on the body of the unfortunate mate but steamed on up the river on time. Whether the murderer was ever apprehended or not I never knew.

It was nearly seven o'clock by the time the boat pulled out and we began to think of trying to find something to eat. In passing the depot we found that our fellow travelers had already gone and we saw no more of them until late that afternoon. All told we had

but twenty cents left and that we expended for two dozen of fresh rolls at a bakers, which served us for breakfast. We then scoured the town in search of work, but by two oclock we gave it up as a fruitless task. Making some inquiries about trains we learned that the freight for Shreveport would leave about ten oclock at night and there was a water tank about five miles up the road where it would stop for water. It was with sad hearts and hungry stomachs that we again took the road. Having eaten nothing since morning we were almost famished and, on reaching the edge of the town, we debated whether to go on, or make an attempt to get something to eat before we left the town. We had not been compelled to beg for anything to eat thus far and the idea was especially repugnant to us, but it looked very much as if it was either beg or starve, so we pocketed our pride, my partner selecting a house on one side of the railroad and I on the other to beg for something to keep us from starving. I was successful in getting something to eat at the first house I visited, being sat down to a table upon which food enough for three or four men was placed. I was ravenously hungry, but for some reason, probably weakness, I could eat but very little and was hungry again almost before I reached the railroad.

We had not walked more than a mile outside of the town when we saw just ahead of us, seated on the side of the road enjoying an after dinner smoke, our companions of the previous day. As usual they had a well filled bag and were waiting for us to come along, they having left town in the morning. We told them of our intention to try and catch the freight for Shreveport and they concluded they would go with us, so we all set out for the water tank walking leisurely along, having plenty of time on our hands. Arrived at the tank we found an old family mansion, falling to ruins, within a few hundred feet of the railroad and we at once took possession. A fire was lighted on the hearth and the bag of provender was opened to see what it contained. Besides the regular supplies of buscuit, bacon, coffee and sugar, there was nearly half a peck of sweet potatoes, and we at once set about the pleasing occupation of getting supper. We did little else but eat and smoke from the time supper was ready until it was time to look for the train. Stretched out in comfortable attitudes on the floor before the fire we passed the time in smoking and telling stories. It was very dark and foggy when the train pulled up at the water tank and we had no difficulty in climbing into a box car, unseen by any of the crew. Being safely stowed away we felt sure of ari de to Shreveport unmolested and fully expected we would be there by morning, but it was nearly two weeks later when my partner and I finally crossed the Red river into that city.

(TO BE CONTINUED.)

An Abused Article.

H. HANSEN.

"THAT casting scabbed pretty badly, didn't it?" is a remark frequently made by molders who are investigating how things turned out to the chipper, who is delivering sturdy blows upon a chisel in his efforts to remove the objectionable defect. If the molder who produced this eye-sore is within hearing distance when the above remark is uttered, he will likely make himself known and offer his excuse in the present case and explain how such things can be prevented in the future, for there are but very few molders, when a casting is bad, who have the courage to acknowledge before a crowd of co-workers, that it is entirely caused by their own bad judgment and forgetfulness. If a body of sand has dropped, you will hear how "some one touched a gagger," and when it is a common scab, I have heard it said by members of our craft, "Yes, it is too bad; nice casting every other way, but what could you expect with such a kind of blacking? That is what caused it to scab in such a manner."

I recollect this elegant excuse distinctly, because I have made a very liberal use of it myself at a time when

I was a very effective sand pounder and nothing else, and did not stop long enough to trace anything from cause to effect. I was then ready to fortify myself with anything that appeared within range; if one excuse was shown to be extremely ridiculous, I forthwith stretched out my imagination into the great unknown for more. No one ventured to define exactly where I stood, neither could anybody say from what source, nor to what science belonged the fountain from which I collected my information, yet I was merely one out of a good many molders, who was more adept in producing a good excuse then a good casting. As I look back, it is with regret that I recall how on more than one occasion both were bad.

I received a compliment once by a foreman upon my ability to find a very small hole, through which I would attempt to escape, in a way that hardly agreed with my theories of applying criticism in our art. Having made a bad casting (successfully) it fell to me also to furnish a suitable excuse to accompany it. Having accomplished this my superior said that I had entered the wrong busiiness, that I would have had a brilliant career, had I but chosen the profession of a lawyer, as I possessed in a large quantity the only quality needed to become successful at the bar, that of lieing. When consciousness was restored to me I was told in very impressive language, that if I valued my position, I would have to dispense with the greatest part of my stock in trade, to make room for other material of which I had but a small percentage.

A statement can be repeated, until it, without the least semblance of facts, will appear as a possibility and entitled to our consideration, and may become part of ones nature, intensifying our predjudices to the greatest extent.

That is the way this malady, about the blacking took a hold of me. I blamed it for everything that happened, it made my molds run out and caused the iron to get into the vents, and I came near holding it responsible for my wages being reduced, and ultimately losing my job.

I have subsequently become better acquainted with it, and instead of regarding it as I did in those days, as a tricky enemy and sometimes as a fraud I look upon it as a friend who if rightly used is of great service and accomodation to us. If we should buy a medicine, we would certainly observe the directions pertaining to it, in applying it, if we expect favorable results. This should also be done with blacking, but the directions concerning it are often neglected altogether, and the result is exactly what would happen from using the medicine in the same way someone gets a bad pain.

Different grades of blacking are recommended by manufacturers for different grades of work, just as different grades of sand are employed. It would therefore seem natural, that, in using such an article, we should conform to the makers wishes, if we desire to hold him responsible for the results, yet in many shops the different grades of blacking, some of which, to all outward appearances greatly resemble one another are placed hap hazard, probably without even a tag to distinguish them. An apprentice is sent to fill a box or bag with blacking, and told that he will find the kind wanted in the barrel that is a "little more than half full" or the barrel that has "got a shovel in it". Now somebody may have shifted the shovel or there may be more than one barrel that can lay claim to the distinction of being a little more than half full. That satisfactory results will not be obtained under such circumstances is evident, when there are so many chances left open for making mistakes.

What can be more careless than to expose the open barrels of blacking to the dust and impurities that abound in a foundry? Or to place this material whose chief foe is moisture, in an outhouse, where snow and rain can play havoc with it? Would any housekeeper leave a flour barrel in such a shape? Yet blacking is just as susceptible to the injurious effects of an exposed condition as the article of food and would undoubtedly receive a closer surveillance, if we were compelled to swallow it. Whether used wet or dry

it will work better and look nicer if it is kept clean and dry.

The tools used in applying blacking will bear looking after as they sometimes cause it to be condemned. If used wet and put on with a swab, this useful adjunct should be clean, and not filled with splinters, pieces of scrap iron and sand, a swab that is loaded down with the latter obnoxious substances will spoil the work of the best blacking on earth. Somtimes a molder will get hold of the coremakers swab, which has been liberally used on hot cores, until the fibers are burned, and it is no better than a piece of coffee sack. If blacking is applied dry with a camel hair brush it is not uncommon to find that the brush has been used for several seasons to apply liquid blacking. A camel hair brush under such conditions is about as excellent an instrument for the purpose as a tooth brush.

It must be conceded, that before blacking can be expected to do a creditable performance it must be applied in a sufficient volume to accomplish this. The molds for the heavier class of castings require a heavier coat than those for lighter work, if blacking is used too heavy on the latter, it will generally be found that the castings will show "cold sheet" if used too sparingly on the heavier work, the sand will fail to peel off the casting, and then we will hear "what poor blacking it must be". This statement is apparently verified by the looks of the casting, but if we retrace our steps and take a look at the molders blacking bucket, if liquid blacking has been used in this case, we shall likely find that it resembles poor soup in that it is very thin, instead of being mixed to the right consistency, in which case the result would have been far different.

On green sand molds, which require considerabe time in their construction, blacking to all appearances often seems to fail in doing that for which it is recommended, for no other reason, than that the mold becomes wind-dried and consequently does not contain at the the surface a sufficient amount of moisture to retain the blacking. It is uncommon to see two dry bodies, possessed of no magnetic influence, adhere to one another, therefore it cannot be expected that dry blacking will take a hold upon a dry mold. It is best in such cases to blow a small quantity of water upon the surface of the mold just prior to applying the blacking, in justice to the manufacturer thereof, who gets more blame than he can well carry anyhow.

Blacking a green sand mold that has become partly dry, without first damping the surface, is a very annoying job. If put on with a camel hair brush or the hands, considerable sand will be loosened, and the casting will have the appearance of being afflicted with the smallpox. If dusted on with a bag the result is but little different under these conditions, for when a pair of bellows are used to clean the mold but little of the blacking will remain. When the iron reaches such a dried up surface, the result is the same as if so much parting sand was located in the same place. Some molders are very careful, that no parting sand shall be left on the pattern in ramming up, yet, by allowing the mold to be closed, when dried up as before stated, the whole surface of the mold will offer but little more resistance to the action of the metal than so much parting sand.

I know molders must have excuses, got to have them, and will have them, no matter at whose expense they are made. I always offer an excuse myself, when some of my shortcomings are exposed, as an apology for my errors, but when I offer such a one as "the blacking is bad," it always seems to me as if there is a merry twinkle in my foreman's eye as he listens to my tale of woe, and although I am not gifted with the faculty of mind reading, I would almost bet that his thoughts run something like this: "I am something of a liar myself, but this outclasses me." It may be possible to prevaricate and state a case in such a light as to entirely obscure the facts to somebody else, but we can hardly make ourselves believe a self-uttered falsehood. In my calmed moments, when in a mood for reflection, I sometimes recall some of these excuses and analyzing them, I find that they are composed of very bad material.

If truth is one of the essential qualities which are necessary to insure us of a better condition in the hereafter, I don't believe that I will be assigned to a very soft berth, unless an exception is made in favor of the molders. So, because I write these lines against the use of flimsy excuses, with special reference to blacking, I don't wish the reader to look upon me as being entirely reformed in this respect myself. I don't wish to become notorious and appear before molders as a curiosity, as I would if I did not offer a bad excuse in preference to none. My attention has, however, been called to the enormous number of inferior excuses with which the market is now glutted, and it should be to our credit to limit production of this kind in the future and to use only those of a superior quality. If we can only make our excuses sound more reasonable, a great step will have been taken towards actual advancement.

Scabbing of molds, on which blacking is used, if not caused by hard ramming, wet sand or other conditions, that would produce this defect if no blacking were used, is generally caused by too much slicking. Some molders seem to entertain the idea that the blacking must be applied to the mold under considerable pressure. This is erroneous; we would never think of securing a perfect casting if we slicked the surface of the mold until it became so hard that the pores in the sand were entirely closed, preventing the free passage of gases therein generated, yet some of us will do this after we apply the blacking. I have done it myself to make the mold shine and then went and blamed the blacking for the bad result afterwards.

A foreman told me a case that came under his observation, as it throws considerable light upon this subject and furnishes an example of what blacking gets blamed for, it will bear repeating. In making rolls he had been troubled greatly with the pest, commonly known as blacking scabs, these little eruptions which are so thin as to almost prevent their being chipped off, and yet and an ugly blemish. Curiously enough they only appeared when someone besides himself mixed the blacking. He impressed strongly upon the molders that they must use not more than one pint of molasses to a bucket of blacking, what was his surprise therefore one day to see a molder exceed the expressed amount by half a gallon, the cause of his troubles became plain. The molders were apparently working under the delusion that the foreman was too stingy in this matter, yet they prevented the very thing they desired to accomplish. The molasses barrel being put under lock and key has been so successful a remedy that the plague has not since reappeared in this establishment.

This useful sweetness, when used in too large quantities, forms a very hard surface to which the iron does not take kindly, and the surface of the mold will sometimes warp or curl up in being dried, leaving cavities into which the iron finds its way, causing a hideous defect. The molasses will do these things, but the chances are that the blacking will receive the blame.

Molders often finish a mold that is to be dried by going over it with a camel hair brush and some molasses or water, after the blacking has been applied with a swab. This gives a nice surface, but care should be taken that it is not put on in too large quantities, or the face of the mold will be nothing but mud and when the mold is being dried this water will be converted into steam, which in passing off will raise the surface of the mold in the form of blisters unless the mold be dried very slowly.

I sometimes feel a sort of repentance when comtemplating the damage done to makers of good blacking, by the unmechanical ways in which it is applied and used in some localities, which are such that no manufacturer would have the courage to guarantee his product. Some inferior kinds of blacking are undoubtedly in the market, for the benefit of those who insist on economizing (on a piece of paper) but I believe that a blacking, sold under the maker's guarantee, will produce the effect promised if applied as directed. So, for whatever we may hold blacking responsible, it should never be such things as knocking the corners off the

mold, that we do with our tools. The different grades of blacking are the product of more enterprise, experiments and study than is commonly supposed, and whatever may be the characteristic traits of each, they are, one and all, more sinned against than sinning.

Philadelphia Foundrymen's Association.

THE regular monthly meeting of the Foundrymen's association was held at the Manufacturers' Club in Philadelphia on Wednesday, September 5, Vice-President Thomas Devlin occupying the chair.

The Executive Committee reported that the tariff bill had been settled, and, as far as foundry interests were concerned, it was not thought they would be affected directly, as the duty on cast iron pipe was 0.6 cent per pound, on general castings 0.8 cent per pound and on malleable iron castings 0.9 cent per pound. The committee had heard of a contract for a new market house that had been given out in Havana, Cuba, the amount of the contract being in the neighborhood of $400,000. Under ordinary circumstances this contract would have been placed in the United States, but since the passage of the tariff bill reciprocity had been declared off, and the contract had been given to a concern in Belgium, the price being 1½ cents to 1¾ cents per pound. The freight rate from Belgium was found to be about 25 per cent. less than from Philadelphia and New York. In addition to this, which works against the American interest, was the fact that the steamship company had advanced the general freight rates 25 per cent. Here was an instance, the committee thought, where the tariff bill had caused the loss of a large contract.

In regard to the condition of the foundry trade the committee reported that while some foundrymen had their shops full of work, the larger number found themselves with few orders. The demand for new work seemed to be no better than it had been during the past several months, as customers were only buying to satisfy immediate wants. The impression the committee had formed was that it was too late in the year to expect a large increase and improvement in the business, but they thought next spring would find foundrymen full of orders, but at small margins.

Reports were next called for from the different sections of the Price Committee. The only report forthcoming was one from the cast iron soil pipe section. P. D. Wanner of the Reading Iron Foundry Company, Reading, Pa., in making the report said: "This trade has improved perceptibly since the cessation of tariff legislation, and prices have been advanced. The indications are that the foundries will all be busy to the end of the season. The pipe men can all stand a stiff advance to help them out partly on the losses sustained for the year.

Trasurer Thompson submitted a report showing a balance in hand of $62.98, all bills being paid.

The secretary announced that J. B. Nau of Allegheny, Pa., had expected to be present to read a paper on "The Herbertz Cupola," a cupola in which was used a steam jet instead of a blower. He, however, had received a letter from that gentleman explaining his inability to attend and stating that he would endeavor to be present at a future meeting with plans and other details.

The secretary then called the attention of the meeting to some cast steel billiard balls lying on the table. The balls, he said, were made by Peter Ostberg, Stockholm, Sweden, and had been sent to the Union League Club, Philadelphia, by Pedro G. Salom, who was at one time connected with the Standard Steel Castings Company of Chester, Pa. The balls were of the same weight as ordinary ivory balls of the same size, and cost about $2 each, or about one-quarter the cost of ivory balls. The castings were mabe with a core, the holes being afterwards plugged and the castings finished in a lathe. The thickness of the casting in it finished state was said to be 1-16 inch.

The subject "Core Ovens, Their Proper Shape, Draft and Economy,"

next came up, and a long discussion ensued. Many ovens were described and experiences related. Ovens heated by steam were conceded to be best for small cores. In regard to large cores direct heat seemed to be the general practice, with provision for thorough ventilation of the ovens. Among those taking part in the discussion were Messrs. Flagg, Matlock, Bancroft, Wright, Register, Glover, Bauer, Messick, Wanner, Rankin, Devlin and Harkins.

The meeting then adjourned.

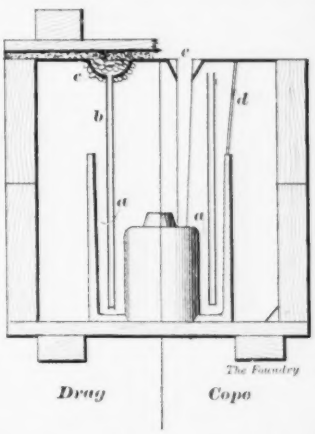
An Accident.

AN accident that happens not very often to Foundrymen occurred recently at the works of the Radford Pipe & Foundry Co., at Radford, Virginia, namely, the telescoping of one of their large cupolas. Perhaps owing to faulty construction, this cupola spread at the charging door section, allowing the stack to drop something like five feet. The problem then was, how to restore the cupola to its original position without accident and without removing the lining and taking the cupola down section by section. This was expeditiously accomplished by first lashing the cupola at the top to the main building of of the pipe foundry; then large cast iron shoes were bolted to the shell just above the roof of the cupola house, and these in turn were bolted to long timber 12 x 12 which were securely blocked and wedged into position as the cupola was straightened back into place by the use of chains and turnbuckles. As soon as in position, the under sections were taken away, leaving the stack in mid-air securely lashed to the building and supported by timbers and castings just described. The roof of the cupola house was strengthened in the meantime by heavy timbers running from the ground to the cupola loft and thence underneath the roof. As the lower part of the old cupola was somewhat worn, and a new one of larger size desired, a new 96" Whiting cupola was erected in place of the old, and joined to the stack which had been held in place. The employees having the job in charge were very much pleased and gratified at the successful completion of the rather delicate work they had undertaken.

Molding Mandrel Pulleys.

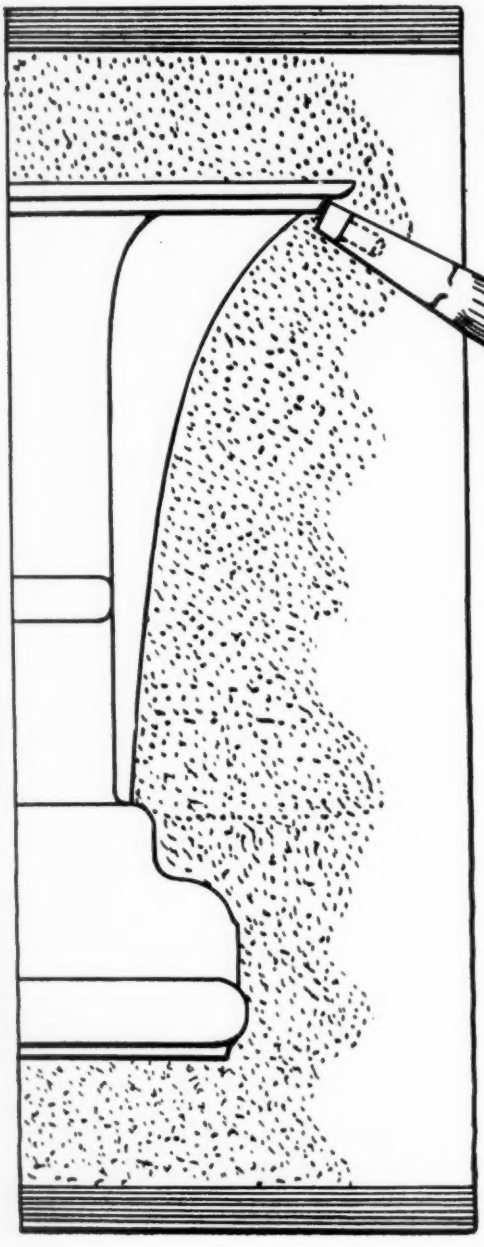
ALEX. CAIRNS.

The illustration shows a method of molding mandrel pulleys. On the left the drag and on the right the cope part of the mold is shown. The principal difficulty in molding these pulleys lies in securing and venting the green sand cores (a, a). Beginning with the drag, facing sand is loosely filled in the pocket at about 1½ inches deep. For rods we use wrought iron strips ⅛ by 1 inch or wood strips of the same size which have previously soaked



in water for an hour or so. The matter of pasteing or clay-washing these rods is a serious one and the fact that it is not usually properly done, is the reason that only about one molder in six can make a job of this kind. Paste or clay wash may be divided into three classes, i. e.: wet, medium and dry. The use of the wet is usually accompanied by bad castings, because the sand at that point absorbs the water in the paste or clay wash and being too wet, for this reason causes cuts, scabs and blow-ups. The medium paste gives better results, but the dry, or that kind mixed to the consistency of dough, is the one that gives the best results. The sand sticks to it best and does not absorb any water from it. Some dry paste or clay wash having been made, the rods and soldiers are dobbed with the hand and the rods set about ½ inch apart and of the length shown at (b). The core is now rammed care-

fully with a small rod or stick and the drag rammed up even with the top of pattern and and the whole well vented with a fine wire. The balance is now rammed up and a groove dug out at (c), the whole well vented, using a straight wire and the rods for a guide. The fine cinders at (c) are set in and the mold continued in the usual manner. The cope is rammed up in the same manner as the drag, except that the wood strips or rods should be used and a few vents or "whistlers" run the mold; as shown at (d).



A Rubber Tipped Rammer Pene.

This illustration represents a Rubber Tipped Rammer Pene, the invention of Mr. R. Viall, Supt. Brown & Sharp Mfg. Co., Providence, R. I. It consists of an iron or brass pene of the usual design; with a mortise or cored aperture in the end. The rubber tip indicated at B in the small engraving has a lug or tennon which snugly fits the mortise in the pene as shown by the dotted line in the illustration. Its value as a rammer arises principally from the fact that it is impossible to bruise

the pattern with it when ramming. This will be recognized as a great advantage over the

ordinary type of pene. In molding work of the class shown in the large engraving, the pattern, if of wood, usually suffers a great deal from careless molders striking it with the rammer. Most every foundryman can testify to a greater or less yearly loss and annoyance from this source alone.

The pene is now being used in Brown & Sharp's foundry and is being called for by their neighbors. The patents have been applied for and the firm expect to be able to furnish them in a short time at very reasonable rates.

Mr. Viall, in his invention, has solved the problem thoroughly and we believe the popularity of the device is assured. It is simple and novel and on the whole, is a very marked illustration of the fact that the origination of improvements in a calling or business is not necessarily confined to the members thereof It is not so mucha matter of experience at that business as it is of an ability to perceive the wants of others.

New Foundry Enterprises.

Hendricks, W. Va.: Pensylvania capitalists will start a foundry here.

The Brunswick Foundry and Machine Company will add new machinery to its plant at Brunswick, Ga.

McDonald & Boland have received the contract for rebuilding the old Filley foundry in Green Island, Troy, N. Y.

The Lexington Foundry are building a storage warehouse to accommodate their increasing stock of patterns.

A mammoth machine works and iron foundry has been located at Franklin, Ind., by eastern capitalists and is to be in operatian by next April.

E. D. Whippley Machine Co., Harriman, Tenn., will start a foundry as soon as they can make the necessary arrangements for a suitable tract of land.

The foundry of the Appleton Mfg. Co., of Appleton, Wis., has been leased for pipe making by Reinhart & Co., of Racine and Chas. H. Wells, of Appleton.

The Scottdale (Pa.) Rolling Mill Company will add a foundry department to its extensive plant in the near future. This will enable the management to do its own molding and also to fill outside orders.

The Buckeye Mfg. Co., now removing from Union City, Ind., to Anderson, Ind., have decided to add a large foundry to the four brick buildings just completed.

The Waterous Engine Company, St. Paul, Minn., will put up a new plant consisting of a 300 x 75 foot main building, a 50 x 100 foot blacksmith shop, a 50 x 100 foot foundry, and a boilerhouse with a boiler battery of 150 horsepower.

The Lawrie Engine Company, of Montreal, Can., is building additions and adding more machinery to its plant. The company is extending the foundry and building new offices and draughting rooms, the old offices will be added to the machine shops.

The property of the Star Foundry Company, on Central avenue, Peekskill, N. Y., has been bought by Mr. Albert K. McMurray, of Lansingburg, N. Y. He will make extensive improvements at once and operate the plant for the manufacture of valves and large castings.

The Lowville Iron Works Company, of Lowville, N. Y., has been incorporated with a capital stock of $13,000 by John T. Horton, Stephen D. Nevins, Alexander R. and Alexander E. Gebbie. The object of the new company is said to be the manufacture of general machinery.

The Metal Reduction Co., of Chicago, capital, $10,000 has been charted to deal in iron and other metals, and to refine and galvanize the same, and to make metal castings and finish the same. The officers are R. D. Morse, pres.; J. F. Forsyth, vice-pres.; F. G. Howell, sec. and treas., and A. E. Petter, supt.

The Adams Company, Dubuque, Ia., manufacturers of light castings, and stoves, have just finished up a large addition to their foundry at the foot of Third street. This addition is 28 x 140 feet, making their foundry 115 x 140, which is one of the largest foundries in the state, which employs over fifty molders.

Foster Brothers, lock manufacturers, will start a foundry in connection with their business, as they have moved into their new quarters. The foundry will be under the charge of Frank Bastain, who was formerly employed in a like capacity by the Schuyler Electric Light Company, Middletown, Conn.

A late dispatch says: Messrs. Thomas, Richard, Hendley and Jones, of Beloit, will build a new machine shop and foundry at

Green Bay. The buildings, upon which work will be commenced immediately, will consist of a main shop 60 by 285 feet in size, and a shop 30 by 82 feet. Besides these there will be several smaller buildings for various purposes. Three acres of land on East river has been donated the company by the Business Men's Association.

The Thomas Brass and Iron Company, of Milwaukee, Wis., writes that it is putting up at Waukegan, Ill., the following brick buildings: 400 x 83 foot machine shop, 250 x 60 foot iron foundry, 200 x 60 foot brass foundry, and 40 x 144 foot boiler house. An electric light system will be installed, and about 300 horsepower will be the capacity of the engine and boiler plant. Mr. R. J. Thomas is President of the company, and the Secretary and Treasurer is Mr. E. H. Hoehnken.

Pittsburg and Vicinity.

So far the increase in the volume of business in this city and vicinity is slight. There is a conservative feeling on all sides, the new tariff not developing any serious effects so far. It is admitted that business is slightly on the increase, but trade will be on a low schedule of prices. Railroad people are placing a number of large orders, which is an encouraging sign. The unsettled condition of prices may be due in some measure to the new tariff duties, and it is a question how long they may continue to rule as they are doing. A well known founder of this district speaking a few days ago remarked: "That for the past few months the foundry trade in this locality has been gradually weakening, until at the present time we hardly have sufficient orders to keep our plant in operation. I find that a large amount of the work is being let to Cleveland parties, who furnish firms in this city with castings far cheaper than what we can turn them out of our shops. This is likely caused by the cheap labor that can be procured at that place. It can not be the fault of the iron because it is of a superior quality and the only reason to be made is the cheap labor. It is true that there is less work being done and how to remedy this matter is hard to tell. The machine foundries are doing about the same amount of work, while stove monufacturers seem to be pretty well engaged, but are not disposing of their stock very rapidly.

Prices for the month show an advance in some lines and are ruling as follows:

No. 1 Foundry,	$12.00 @	$12.50	Cash.
" 2 "	11.00 @	11.50	"
" 1 Char. Fdy.	17.00 @	17.50	"
" 2 "	16.00 @	16.50	"

L. M. Morris, of Pittsburg, has contracts on hand which will call for about 1700 tons of structural material; 900 tons for the Pittsburg Central High School Building; 200 tons for the Hermes Building and 600 tons for two new buildings on Penn avenue.

The Union Foundry and Machine Co. of this city, has recently supplied the Citizen's Traction Co. with a number of helical gears, also with a number of pinions. Orders for flywheels have been received from the Clinton Iron and Steel Co. of this city and from the Montpelier (Ind) Tiu Plate Co.

NOTICE.

Advertisements inserted under this head for 25 Cents a line each insertion.

WANTED—If you are in need of the services of a first class brass molder, capable of taking charge of your foundry, address C. E., No. 18 Mechanic Street, New Haven, Conn.

WANTED—Foreman for foundry making cast iron water pipe; must understand the business in all its details and be able to handle me economically. Give experience and reference. Address W. F. L., care this office.

ANYONE IN NEED of the services of an experienced foundryman with an A1 record of 25 years on malleable, stove plate and light machinery, can secure the same by addressing F. O. G., 1095 Payne avenue, Cleveland, O.

READERS of *The Foundry* who are in need of or desire figures on any class of supplies or machinery not advertised in our columns will be placed in communication with dealers upon request.

A LOAM MOLDER, experienced in heavy engine, furnace and marine pipe work, desires situation; American and European references. Address, A. L., care "The Foundry."

WANTED—Experienced foundryman having some capital to invest, to take charge of modern establishment, investment satisfactorily secured. Address A. B., care "The Foundry."

FOR SALE—One D sized Collian cuopla in good condition. Address Dawes & Myler, New Brighton, Pa.

FOR SALE—A complete stove foundry, with patterns for wood, coal, cook and heating stoves, flasks, tools, etc., for rent, lease or sale. New brick building, new boiler, engine blower, cupola and all other machinery; molding floor for 22 molders; mounting room 100 feet, well lighted, south front. Everything in splendid condition and ready to be started at once. Repair works will almost pay the rental. A rare chance for a practical foundryman with limited means. Good location for a general foundry; 100 tons of school furniture castings used by old established company in town, are made in another state and have to be shipped to our city. About six carloads sashweights used annually by our jobbers. Address H. S., this office.